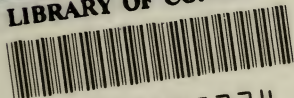


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TOBACCOISM

OR

HOW TOBACCO KILLS

By JOHN HARVEY KELLOGG

M. D., LL. D., F. A. C. S.

Fellow of the Society of Hygiene of France, of the Royal Society of Medicine of Great Britain, of the American Medical Association, and of the National Geographical Association, Late Member of the Michigan State Board of Health, Editor of "Good Health," Superintendent of the Battle Creek Sanitarium

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Foreword

A few years ago, a business man about forty years of age entered my office evidently in a state of considerable excitement. Without stopping to seat himself, he said in a voice trembling with emotion,

"Doctor, I am told that I have myocarditis (tobacco heart), with casts and albumin, and my physician will not promise me more than a year and a half or two years to live. Now I want you to tell me how to live so I can have ten years more in which to develop my business. I am head of a business enterprise which I induced my friends to invest in several years ago and thus far it has brought no returns. Development has been slower than we expected and it will take ten years more to make it a real success which will insure my friends a good return for their investments. I am absolutely indispensable to the business. If I fail, the whole thing will fail and my friends will lose every dollar of their money. I must have more time, then I shall "make good" and everybody will be happy. Tell me, doctor, how I can keep on my feet for just ten years more. I'll do anything you say, eat anything you order, follow any rules you may lay down to the letter.

"I've stopped smoking, of course. I stopped at once when I found what it was doing to me. I never would have smoked one cigar if I had known that it was harmful. Now I've stopped. I'll soon be all right, won't I? Now, just tell me what I can do to live ten years more and make my business a success."

As the speaker paused, he leaned forward in his chair and with an expression of anxiety and eager expectation, awaited an answer. I could only say to

him, "My dear sir, we will do our utmost for you, but the trouble is, your safety margin is used up, your reserve is gone. Your heart, liver and kidneys have carried such a heavy burden, done so much overwork for years that they are worn out. Your blood-vessels are hardened and shrunk, greatly increasing the work of the heart, while the heart is degenerated and weakened, the usual effects of nicotine; and so a vicious circle is formed. You are like a man whose once great bank balance of millions has been reduced by extravagance to a few cents. His fortune is gone. Economy and reform will not bring it back. We will do our best for you. But with heart and kidneys both so badly damaged, there is little on which to base an extended life expectancy."

"But I've stopped smoking. I'll never touch it again. I'll soon be all right, won't I, with careful living? I can't leave my business. It will go to smash and ruin my friends who trusted me. Doctor, you must keep me going somehow. If you can't give me ten years, make it five. I can do something in five years. Make it five, Doctor. I must live long enough to make good and save my friends from loss."

As I hesitated, seeking to find some word which would convey a little ray of hope for a despairing soul facing an awful tragedy, the man read my thoughts, and saw there was no hope. He sprang from his chair for a moment and strode back and forth in my office, pulling his hair out by the roots. Suddenly, he paused a few seconds, then, with a look of mingled terror, despair and indignation, he rushed at me, and shaking his clenched fist close in my face, he fairly shrieked, "Why didn't I know this before? Why didn't somebody tell me what tobacco would do to a man? I never dreamed there was any harm in it.

Doctors smoke, preachers smoke ; everybody smokes ; I thought, of course, it must be harmless. If I had even dreamed that tobacco would injure my health or my business, I would have cut my throat as soon as I would have smoked. *Why didn't I know this before?"*

With this shaking, screaming, figure before me, with blazing eyes glaring at me, I felt myself shriveling to a shred, a contemptible, cowardly wretch. I quailed and cowed before those piercing eyes. Here was a man who had lost his chance "to make good," because he was ignorant of the subtle power of nicotine to destroy men and business. And he evidently felt that I was responsible for his undoing, because I had known and had not informed him. I feared his judgment was just. A sense of guilt overshadowed me. I determined to try to make amends. Hence this book.

THE AUTHOR.

Preface

Tobacco, in its various forms, is one of the most mischievous of all drugs. There is perhaps no other drug which injures the body in so many ways and so universally as does tobacco. Some drugs offer a small degree of compensation for the evil effects which they produce; but tobacco has not a single redeeming feature and gives nothing in return for the \$1,500,000,000.00 which it costs the nation annually, besides the 100,000 lives which it probably destroys.

It has long been known to medical men, chemists and pharmacists, that tobacco is one of the most deadly of all the many poisonous plants known to the botanist. Aside from its use by the devotees of the drug, practically its only use by man is for the killing of parasites on livestock, and the destructive pests, both animal and vegetable, which attack our orchards, gardens, and greenhouses.

To please men and to kill parasites are the only uses of tobacco—its ultimate effects are the same in both cases.

How marvelous the ability to so camouflage its venom that millions of men are made to believe harmless a weed which almost every other living creature than man, great and small, recognizes and avoids as a baneful poison!

Alcoholism, the opium habit and tobaccoism are a trio of poison habits which have been weighty handicaps to human progress during the last three centuries. In the United States, the subtle spell of opium has been broken by restrictive legislation; the grip of the rum demon has been loosened by the Prohibition Amendment to the Constitution, but the tobacco habit still maintains its strangle-hold and more than one hundred million victims of tobaccoism daily burn incense to the smoke god.

The battle against alcoholism was won by a campaign of education, the foundation for which was laid by that historic

body of eminent men of science, "The Committee of Fifty." When subjected to the searching scrutiny of these competent and conscientious investigators and tried in the crucible of laboratory research, every one of the pseudo virtues of alcohol vanished in smoke and out of the crucible rose a spectre of such forbidding aspect, that alcohol, thus stripped of its camouflage, stood naked before the world the hideous demon that it is; and the men and women by whom civilization must be saved, if it is saved, set going the campaign of education which culminated in the achievement of a constitutional foundation for prohibition, one of the greatest steps of progress toward Race Betterment ever made.

Tobacco has not yet been fully tried before the bar of science. But the tribunal has been prepared and the gathering of evidence has begun and when the final verdict is rendered, it will appear that tobacco is evil and only evil; that as a drug it is far more deadly than alcohol, killing in a dose a thousand times smaller, and that it does not possess a single one of the quasi merits of alcohol. No one even suggests that tobacco is a remedy for collapse, a food, a prop for the weak or an antidote for snake-bite, the plausible apologies for alcohol which so-long deceived the public as to its real character.

Now that the brewer and the saloon have been eliminated, the time has come for a campaign against those kindred enemies of the race, the tobacconist and the smoking-room. It will doubtless be a long and bitter fight; but victory will be the final result, for civilization must be rescued from these destroying forces. This end will be attained only by scientific research and the patient education of the rising generation. Already progress is being made. A "Committee to Study the Tobacco Problem," comprising some of the ablest scientists in the world, has been organized and has begun the work of collecting and sifting the evidence which has already been developed and has set to work some of the world's most expert physiologists, chemists, psychologists,

educators, statisticians and other scientific experts in well-equipped laboratories, delving into every phase of the tobacco question. In due time their findings will be published and one more enemy of the race will stand before the public with its real character revealed, condemned by such authoritative evidence as cannot be impeached. But the writer feels that what is already indisputably known makes possible a very certain forecast of what the ultimate verdict will be.

The following most interesting statement made in his annual address as retiring president of the American Academy of Engineers by Dr. J. A. L. Waddell, D. S. C., D. E., LL.D., is one of the clearest and most significant pronouncements against tobacco which has appeared from non-medical scientific sources (*Scientific Monthly*, July, 1918):

"While the efforts of certain scientists to prohibit (prevent?) the use of tobacco have proved a failure, as far as the populace is concerned, they have succeeded in convincing thinking men that the effect of nicotine in the system is to reduce materially one's mental acumen; consequently, *a very large percentage of the scientists and engineers of today do not use the weed. As a direct result of this there is a small but quite appreciable augmenting of their individual output.*" (Italics ours).

Evidently the campaign against the tobacco plague is making progress. Men of the training and standing of Dr. Waddell do not make random or ill-considered statements. Dr. Waddell gives us the results of his observations of the habits of scientists and engineers, men whose professional duties are most exacting and often exhausting. It is most encouraging to know that "a very large percentage" of these men of unusual knowledge, as well as highest intelligence, the leaders in scientific progress, are convinced of the evils of tobaccoism and "do not use the weed."

This observation is quite in harmony with that of Dr. William Mayo, the eminent surgeon, who on one occasion when entertaining a company of surgeons in his home re-

marked, "It is customary, as we all know, to pass around cigars after dinner, but I shall not do it. I do not smoke, and I do not approve of smoking. If you will notice you will see that the practice is going out among the ablest surgeons, the men at the top. No surgeon can afford to smoke."

When the whole truth is known about tobacco, and every man, woman and child in this great Republic has been made acquainted with the appalling facts about this noisome weed, the vocation of the tobacconist will become as unsavory as that of the saloonist, and in due time an enlightened society will purge itself of this unclean and hateful thing.

Besides presenting a summary of what is already known and established by scientific research and medical observation respecting the influence of tobacco upon the physical well-being of men, the writer has undertaken to point out effective methods by which the victims of the tobacco habit may make a quick and permanent escape from its toils, when the desire exists so to do. The methods suggested are not experimental; they have been tested and found of real service at the Battle Creek Sanitarium, where more than twenty thousand sufferers from the tobacco habit have been received as patients, and have been successfully treated by the methods recommended.

In compiling the facts and experimental observations which modern scientific research has developed in relation to tobacco, free use has been made of the numerous books and other contributions on this subject which have appeared in recent times. Of the scores of authorities consulted, the writer is especially indebted to a most valuable treatise by Gy, of Paris, "*L'Intoxication par le Tabac*," in which is summarized much of the most important data which scientific inquiry has developed.

J. H. K.

Battle Creek, October, 1921.

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A Brief History of the Tobacco Habit

Tobacco was used by the American aborigines in connection with certain religious ceremonies. There is no evidence that it was ever so generally and freely used by the Indians as by the present inhabitants of this country.

Columbus saw the first smokers when he discovered America. Ramon Pane, a monk who accompanied Columbus on his second voyage, observed the practice of snuff-taking, and the practice of chewing was noted by a party of Spanish explorers in 1502 when approaching South America.

Ralph Lane, the first governor of Virginia, was the first English smoker. He presented a pipe and tobacco to Sir Walter Raleigh, who soon acquired the habit and started in England a vice which has become a menace to the future of the human race. Historians tell us that Raleigh smoked a pipe just before he ascended the scaffold. It is certainly a pity that his vice did not perish with him.

The white race has made no original discoveries in methods of using tobacco. Smoking, chewing, snuff-taking, are all poison habits borrowed from the ignorant savages who once peopled the Western Hemisphere.

Sir Walter Raleigh helped to create a demand for the weed by smoking or "drinking" tobacco, as it was then called, in public and private.

King James beheaded Sir Walter for treason and tried to stop the use of tobacco by means of a "counter blaste" in which he condemned tobacco-using as "A custom loathsome to the eye, hateful to the nose, harmful to the brain, dangerous to the lungs, and in the black, stinking fume thereof, nearest resembling the horrible Stygian smoke of the pit that is bottomless."

Tobacco was extolled as the panacea for all human ills. A veritable tobacco "craze" seized the country. In London there were more than seven thousand tobacco shops.

King James, by royal edict opposed the practice, but the shrewd business methods of the promoters of the tobacco traffic kept the practice alive.

King James evidently had a very healthy aversion to the weed. He declared, "Surely, smoke becomes a kitchen far better than a dining chamber."

The spread of the practice during the 17th century was so rapid that numerous sovereigns thought it necessary to make efforts to suppress it. The Sultan of Turkey (Amurath IV.), prohibited smoking and condemned smokers to death. In Russia (Michel III.) smokers were punished by cutting off their noses. The Shah of Persia (Abbas II.) made equally stringent laws against tobacco, and Pope Urban VIII. anathematized smoking in church.

In spite of the opposition of King James and his successors, Charles I. and Charles II., the culture and use of tobacco increased until the tobacco plantations in the colonies exceeded in size all other crops together. The habit grew during the period of the commonwealth, and even Cromwell smoked. At Eton the boys had lessons in smoking every morning and a pupil was "Soundly whipped because he refused to smoke."

In the time of Queen Anne, snuff-taking was introduced. The soldiers returning from the Peninsular war brought in the practice of cigar smoking and in like manner the cigarette habit returned with the army from the Crimea.

Some of the Puritans smoked, but the Quakers always opposed the use of the weed, and the Wesleyan conference forbade its preachers to smoke, chew or take snuff as early as 1795.

The cigarette habit was introduced into this country by foreign visitors to the Centennial Exhibition in 1876, since which time it has spread with astonishing rapidity among all classes, especially the young.

The Recent Rapid Growth of the Tobacco Habit.

Within the last quarter of a century, the growth of the tobacco habit in all parts of the world, and particularly in the United States, has been phenomenal.

The world's production of tobacco was in 1894, 1,560,000,000 pounds; 1913, 2,722,000,000 pounds.

Increase, 1,162,000,000 pounds or an increase of 74 per cent in 19 years.

In the United States the production of tobacco was in 1894, 360,000,000 pounds; 1914, 1,034,000,000 pounds; 1920, 1,508,000,000 pounds, an increase in 26 years of 319 per cent.

The per capita consumption of tobacco in the United States in 1880 was 80 ounces; in 1914, it was 112 ounces, and in 1920, about 180 ounces.

The following table compiled by the Census Bureau shows the enormous increase of the cigarette habit in ten years as shown by the number manufactured:

1902—2,971,360,447.

1906—4,511,997,137.

1910—8,644,557,090.

1920—62,000,000,000.

The above figures show an increase of more than 59,000,000,000 cigarettes in 18 years or nearly 2,000 per cent, an unparalleled example of rapidity in the spread of a disease-producing vice. Continued increase at the same rate will produce in the year 1930, seventeen cigarettes daily for every one of the 115 million men, women and children now living under the American flag.

Of the 62,000,000,000 cigarettes manufactured in 1920, 46,000,000,000 were consumed in this country (Department of Commerce), or 460 cigarettes for every man, woman and child in the United States.

The Properties of Tobacco

The several varieties of tobacco differ greatly in the amount of nicotine which they contain, as shown by the following table published by the *American Druggist*:

Nicotine Content of Different Tobaccos

	Per cent of Nicotine
American Chewing Leaf.....	.93
Syrian Tobacco Leaf.....	1.09
Chinese Tobacco Leaf.....	1.90
Turkish Coarse Cut.....	2.50
Golden Virginia (whole strips).....	2.50
Gold Flake Virginia.....	2.50
Navy Cut (light).....	2.53
Light Kentuckian.....	2.73
Navy Cut (dark).....	3.64
Best "Bird's Eye".....	3.93
Best Shag (a).....	4.90
Cut Cavandish (b).....	4.97
Best Shag (b).....	5.00
Algerian Tobacco (a).....	8.81
French Grown Tobacco.....	8.71
Algerian Tobacco (b).....	8.90

From the above it appears that the nicotine content of tobacco varies between 1 and 9 per cent. according to the variety of tobacco. In general, pipe tobacco contains the most nicotine.

The average nicotine content of all tobaccos is probably about 3 per cent. The billion pounds of tobacco raised in the United States annually, contains, then, 20 to 30 million pounds of nicotine, each drop of which carried death-dealing properties second only to those of prussic acid, the deadliest of drugs.

The Composition of Tobacco Smoke.

The burning of tobacco in pipe, cigar or cigarette, gives rise to various substances which are not originally found in the tobacco leaf. According to Dr. J. Dixon Mann, F. R. C. P. (*British Medical Journal*, 1908) tobacco smoke contains a formidable list of poisons among which are the following:

Nicotine	Prussic acid
Pyridine bases	Carbon Monoxide
Ammonia	Sulphuretted hydrogen
Methylamine	Carbolic acid

The United States Dispensatory notes in addition to the above

Marsh gas	Parvolin
Nicoline	Coridin
Lutidin	Rubidin
Collidin	Viridin

Three other poisons, pyrrol, formic aldehyde and furfural are mentioned by Arnold.

Nicotine Not Destroyed in Smoking.

It thus appears that tobacco smoke contains not less than nineteen poisons, every one of which is capable

of producing deadly effects. Several of these, nicotine, prussic acid, carbon monoxide and pyridine are deadly in very small doses so that the smoker cannot possibly escape their toxic effects. To these poisons are attributable the various destructive effects upon heart, lungs, liver, kidneys and other bodily organs that are described in succeeding chapters.

The idea generally held that the nicotine is practically destroyed so that little of the poison is absorbed has been shown to be an error. *The London Lancet*, one of the leading medical journals of the world, a few years ago made a careful study of the composition of tobacco smoke as determined by improved methods of chemical analysis. It was found that tobacco smoke always contained nicotine, the amount varying with the variety of tobacco and the mode of using. Some tobaccos gave off in the smoke only 10 per cent of their nicotine content, while the smoke of others contained four-fifths of the total nicotine present. Pipe smoke contained most nicotine, sometimes more than 2 per cent. Cigar smoke contained less and the cigarette least.

Cavendish smoke contains more than 4.00 per cent of nicotine and Perique 5.3 per cent.

But the cigarette was found to contain another active poison, furfurol, which though less active than nicotine is fifty times as toxic as alcohol (*Lancet*). In very minute doses it produces staggering, trembling and twitching. Larger doses

produce convulsions resembling those of epilepsy and muscular paralysis. So what the cigarette lacks in nicotine it makes up in furfurol.

Furfurol is the characteristic ingredient of bad whisky. It is highly pungent and acts as a powerful irritant to the mucous membrane of the throat. There is as much of this poisonous furfurol in the smoke of one Virginia cigarette as in two ounces of whiskey. (*Lancet.*)

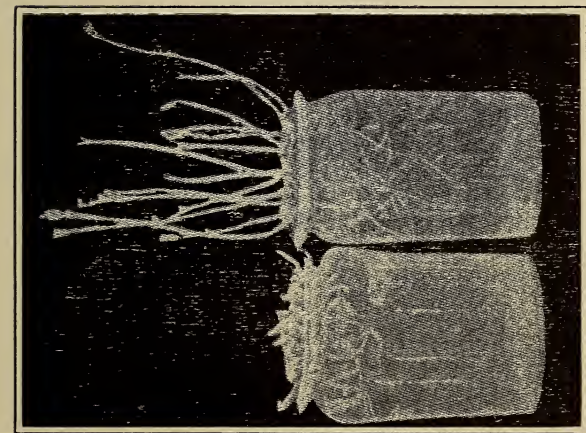
It is interesting to note that the symptoms characteristic of furfurol tally closely with those which result from cigarette smoking. (*Lancet.*)

The British Medical Journal has shown that cigar smoke contains less nicotine than pipe smoke because the nicotine is condensed in the stump. Analysis shows that a cigar stump contains five times the original amount of nicotine. After the first half of the cigar has been smoked, the remaining half contains most of the nicotine of the whole and further smoking results in the inhalation of much nicotine.

Carbon monoxide and *ammonia* are other poisons found in very appreciable quantities in tobacco smoke. The first named is a highly active blood poison; it damages the red cells of the blood and thus produces a condition akin to suffocation.

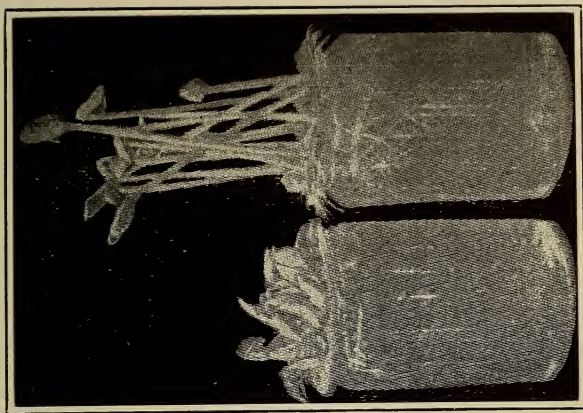
Acrolein, a highly irritating poison, is produced by the burning of cigarette paper.

A cigarette weighing one gram gives off, when smoked, more than half a grain of nicotine, half



PUMPKIN

Experiment Showing the Dwarfing Effect of Tobacco Smoke upon Plant Growth (Molisch)



PEAS

a grain of ammonia, and one-seventh of a grain of pyridin.

An ounce of tobacco produces, when smoked, one-fifth pint of carbon monoxide.

Tobacco smoke contains one-sixteenth of 1 per cent. of formaldehyde, according to Dr. Arnold (*London Lancet*).

According to Dr. Spitzka, the smoker of cigarettes who "inhales," may absorb so much as 79 per cent. of the nicotine of the smoke, which in turn may contain half or even more of the nicotine content of the tobacco, besides pyridine, carbon monoxide and other worse poisons.

Tobacco More Poisonous Than Deadly Nightshade.

Deadly nightshade belongs to the same botanical class of plants, but is less poisonous than tobacco; yet who would think of smoking this noxious weed.

The habitual smoker lives in a chimney, or rather, he himself becomes a part of a chimney in which is burned a poisonous weed.

In view of the above facts it is evident that every package of cigarettes ought to bear a skull and cross bones and should be marked "deadly poison" like "Rough on Rats" and other deadly drugs.

Poisonous Effects of Tobacco on Plants.

In an article published in *Die Umschau* a few years ago (1911), Prof. Mölisch, an eminent scien-

tific authority, summarized the results of an exhaustive research upon the effects of tobacco smoke upon growing plants. We quote the following condensed summary of these interesting observations from the *Scientific American Supplement* (Sept. 23, 1911):

Tobacco Intoxicated Plants.

"Very young seedlings of peas (*Vicia Sativa*), about one-tenth-inch high, were placed on a piece of tulle, which was stretched over the mouth of a jar so nearly filled with water that most of the roots were immersed, while the stem and seed leaves were above the cloth. A large beaker glass of more than one gallon capacity was inverted over the jar, with its mouth resting on a plate and sealed by a shallow layer of water. The operation of covering the jar with the beaker was conducted in front of an open window, in order to fill the vessel with pure air. The beaker was then slightly tipped and three mouthfuls of tobacco smoke were blown into it through a bent glass tube. Another jar similarly planted and covered, but not smoked, served as an object of comparison. Both beakers with their contents were covered with zinc covers which completely excluded the light, and were kept in the greenhouse at a temperature of 60 to 65 deg. F. Six days later the two jars presented the appearance shown (see cut) in which the injurious effect of the tobacco smoke is startlingly evident.

"The plants in the left hand jar, which had been exposed to the smoke, were greatly stunted and their thick stalks grew obliquely, horizontally, or even downward, while their buds showed scarcely a trace of the red tint of anthocyan which tinged most of the buds of the plants which had grown in pure air.

"When the seedlings are grown in water, a single mouthful of tobacco smoke is sufficient to produce a marked effect and, what is more surprising, if the beaker is filled with tobacco smoke, rinsed with water, allowed to stand 24 hours, and then filled with pure air and inverted over the young plants, an appreciable effect is produced by the vaporization of ingredients of the tobacco smoke which have condensed on the inner surface of the beaker and have not been removed by washing.

"Very similar results were obtained with seedlings of peas, pumpkins and beans. The accompanying cuts show the enormous effect upon the growth of these plants.

"The experiments show plainly that tobacco smoke greatly diminishes the length and increases the thickness of the stem, and destroys its natural negative geotropism, i. e., its tendency to grow vertically upward. The smoked seedlings often assume a horizontal or inclined position, an appearance quite similar to that observed by Nel-

jubow and Richter in young plants growing in laboratory air.

"The effect of laboratory air upon plants has been attributed, probably correctly, to traces of illuminating gas and the products of its combustion. Tobacco smoke unquestionably exerts a similar effect and in future experimentation with plants more attention must be paid to this influence.

"The fact that greenhouse plants are apparently not injured by fumigation is due to the circumstance that the influence of the tobacco smoke is usually exerted only for a night, after which the house is thoroughly ventilated, and that the damp walls and soil purify the air by absorbing the smoke.

"But in ill-ventilated rooms in which tobacco is often smoked in large quantities, and in which no such rapid absorption takes place, plants must suffer greatly. The peculiar morbid appearance exhibited by plants growing in dwellings, restaurants and shop windows is due partly to darkness, dust, and dryness, and partly to impurities derived from illuminating gas and tobacco smoke."

It is probable that the toxic effects of tobacco smoke upon plants was not due to nicotine, but to pyridin, sulphuretted hydrogen and carbon monoxide, which are found in the smoke of all varieties of tobacco and in about the same proportions, and which must act as injuriously upon human beings as upon plants, and especially upon young children and infants.

Effects of Tobacco upon Micro-Organisms

It is interesting to note that certain forms of plant life, bacteria, are even more susceptible to the poisonous effects of tobacco than are higher plants. Mölich found that:

"The rapid influence of tobacco smoke on bacteria is especially evident in luminous bacteria. A piece of filter paper three inches square is moistened with a few drops of a strongly luminous bouillon culture of the marine bacterium *Pseudomonas lucifera*. In a dark room the round spot formed by the liquid appears brightly luminous to an eye accustomed to the darkness. If the paper is placed in a glass box containing a little tobacco smoke, and observed in a dark room, the spot usually becomes invisible within less than one minute, although a similar preparation in pure air continues to shine with undiminished brightness for an hour or more. If, immediately after the disappearance of the light, the paper is removed from the smoke box and placed in pure sea water, the luminosity usually returns in a minute or two. In this case the tobacco smoke acts similarly to ether or chloroform, by exerting an immediate and temporary narcotic effect upon the bacteria, but it does not kill them, and so has no value as a disinfectant."

Tobacco Deadly to Animals.

Mölich experimented upon low forms of animal life and found that tobacco exerts a more deadly

influence upon these organisms than upon plants. He devised a cell by means of which "the micro-organisms contained in a suspended drop of water can be observed under the microscope, while exposed to the direct influence of tobacco smoke. The cell is fumigated only once, at the beginning of the experiment. In these conditions the motions of certain species of amoeba begin to flag in from five to ten minutes. The organisms assume a spherical form, protrude hyaline processes, and finally fall to pieces about thirty minutes after exposure to tobacco smoke. The stemless bell animalcule (*Vorticella*) ceases swimming after fifteen minutes' exposure and continues merely to move its cilia, and dies in two or three hours."

The learned editor of the *Scientific American* very justly adds: "If the living substance of plants and of minute animals is so strongly affected by very small doses of tobacco smoke it is hardly credible that saturation of the mouth and the organs of respiration with tobacco smoke, continued many years, can be entirely free from injurious effects."

That tobacco is a poison to animals has long been known. A decoction of tobacco is used to destroy lice and other parasites which infest sheep and cattle. Sometimes the careless use of the drug for this purpose leads to death of the animals.

Greenhouse men burn tobacco in their propagating houses to kill green flies and other para-

sites. The destruction of parasites is the one useful service which tobacco is capable of rendering as was facetiously pointed out by Dr. H. W. Wiley in *Good Housekeeping*.

"When old Hans Schmidt, who was acknowledged to be the meanest man in the neighborhood, had been placed in the grave, and the audience, according to the good old Pennsylvania custom, had waited long for some good neighbor to say something good of him so that the grave might be filled, Gustave Schultz ended the embarrassment by walking to the edge of the grave, taking off his hat, and saying, 'Well, I can say joost one good ting about Hans, he wuzzn't always as mean as he wuz sometimes.' So can I say one good thing about tobacco: A decoction of tobacco is speedy death to lice and ticks and makes an ideal dip for pigs and poultry."

The British Medical Journal reports that tobacco leaves have been successfully used as a protective against plague-infected fleas in India.

Dr. Pidduck states that leaches die instantly when made to suck the blood of smokers.

Bees, flies and other insects are quickly killed by directing upon them a stream of tobacco smoke.

A drop of nicotine on the shaven skin of a rabbit will produce death in a short time.

According to Traube a minute quantity of nicotine injected into the jugular vein of an animal, caused the blood pressure to rise to two and one-half times the normal after first dropping.

The Journal of the American Medical Association says (May, 1917):

"Experimental research has confirmed that tobacco may induce a tendency to convulsions in animals. A number of research workers have recently reported cellular changes in the cortex of rabbits and guinea-pigs long submitted to slow tobacco intoxication."

Two French scientists, M. M. Fleig and de Visme, have been experimenting on the effects of tobacco in various forms, when administered to dogs, rabbits, rats and guinea-pigs.

The effect of causing a dog to inhale the smoke of tobacco was found to be to cause first a marked fall, then a great rise in blood pressure, great contraction of the vessels of the kidneys and a dilatation of the vessels of the brain. The intensity of the effects produced was in proportion to the amount of nicotine contained in the tobacco.

According to Vibert, the cat and the rabbit are killed by one-sixth of a drop, a dog one-half drop to two drops.

According to Leblanc a horse is killed in four minutes by eight drops.

Planas showed that the poisonous properties of nicotine are very rapidly and strongly manifested when it is applied to the rectum or to the conjunctiva.

According to Guinier, death occurs most rapidly after application of the poison to the trachea.

A glass rod dipped in nicotine was applied to the throat of each of three young cats. The effects were the same in each. Within six seconds the cats suffered from dyspnea and dragged the hind legs. Then general convulsions occurred. The sphincters were relaxed, froth appeared at the mouth, and at the end of fifteen seconds death occurred.

Claude Bernard showed that one drop of nicotine applied to the cornea of an animal is sufficient to produce instant death.

One drop of nicotine was applied to the eye of a white mouse and the eye of a sparrow. Both animals died instantly.

Ritchie of William and Mary College reports the following observation:

Two young guinea-pigs that were made to inhale tobacco smoke from the fourth day after birth weighed on the forty-fourth day, 174 and 169 grams (5.8 and 5.6 ounces), respectively, instead of 330 grams (11 ounces), which is the normal weight of guinea-pigs at that age. On the forty-fourth day, one of them died; the other was not subjected to any further inhalations; nevertheless, at the end of the third month, its weight was only 295 grams (9.8 ounces), instead of the normal weight, namely, 485 grams (16.2 ounces).

"Jebrofsky, a Russian investigator, by means of an ingenious apparatus, compelled rabbits to smoke cigarette tobacco for a period of six to

eight hours daily. Two animals died within a month, and showed changes in the nerve ganglia of the heart. Others established a tolerance similar to that exhibited by human beings who become habitual smokers, but upon being killed at the end of five months, degenerative changes similar to those produced by the injection of nicotine were found, viz., hardening of the blood-vessels. Loss in weight was also observed. There seems to be little doubt that tobacco smoke poisoning is chiefly nicotine-poisoning." (Fisk.)

But even as a dip for tick-infested cattle, tobacco is not always harmless. A Western farmer reported to the writer that he lost six highly valuable cows because the man in charge of the "dipping" made the decoction double strength to make sure of good results. One of the animals died in the dipping tank. All the rest died within an hour. The tobacco performed its function efficiently. It is a good killer.

Gouget (*La Presse Médicale*, 1906) gave to rabbits small doses of a 10 per cent infusion of tobacco which probably contained about one-half of 1 per cent of nicotine. Many of the rabbits died within a few weeks. The rabbits suffered convulsions and their blood vessels were degenerated.

Adler and Heusel gave rabbits nicotine in quarter grain doses. Degenerative changes in the aorta were noted after 18 to 25 doses. Lime was

deposited in the walls of the large vessels and in some cases small aneurisms appeared.

In general, animal experiments have shown that tobacco is a cardiovascular poison.

Noel, Le Bon and others have shown that the toxicity of tobacco depends less upon the nicotine, its principal alkaloid, than upon the numerous other substances which are produced by the burning of tobacco. These authors have shown that tobacco smoke contains a crowd of noxious products. Le Bon isolated collidine and showed that one-twentieth of a drop of collidine is sufficient to quickly kill a frog, with symptoms of paralysis. "One cannot breathe the vapor of collidine even for a few seconds without experiencing muscular weakness and vertigo."

According to the same physiologist, the nausea, vomiting and headache produced by smoke are the result of the action of prussic acid. Prussic acid is found in tobacco in the proportion of three to eight milligrams ($1/25$ to $1/8$ grain) in 100 grams ($3\frac{1}{2}$ ozs.) of tobacco.

Vohl and Eulenberg believe that most of the symptoms produced by tobacco smoke are due to prussic acid and collidine.

Grenant killed a dog with tobacco smoke. He found the blood showing all the characteristics present in poisoning by carbon monoxide.

Dudley attributed the effects of cigarette smoking to the same cause, carbon monoxide. Dudley

also claimed that carbon monoxide is the most poisonous substance found in tobacco smoke.

Marcelet has shown that one gram of tobacco (15 grains) in the form of a cigarette produces 20 to 80 centimeters (1 to 5 cubic inches) of carbon monoxide. A smoker who consumes 20 grams ($\frac{2}{3}$ ounce) of tobacco a day produces 1,600 to 2,180 cubic centimeters (100 to 125 cubic inches) of the gas.

The general conclusions drawn from the observations made in recent years is that the intoxication due to smoking is attributable not alone to the natural poisons of tobacco, but to tobacco smoke; that is, to the poisons produced by the combustion of tobacco.

Tobacco a Virulent Poison to Man.

Wood's Materia Medica (1860) states that instances of death are on record from taking a decoction of one-half dram of tobacco. The fatal dose of nicotine was probably half a grain to a grain. Wood also states that fatal results have followed smoking and even the introduction of smoke into the rectum to excite bowel action.

An absolutely dispassionate, coldly scientific, impartial testimony comes from a standard work on "*Materia Medica and Therapeutics*" by John V. Shoemaker, A. M., M. D., a leading physician of Philadelphia and one of the world's most eminent authorities on the effects of drugs, who says:

"Tobacco is an acro-narcotic poison, acting energetically, in small doses, upon persons unaccustomed to its use. It is a nauseating emetic, being accompanied by great muscular relaxation; the respiration and circulation are depressed, the temperature lowered, and the surface becomes cold and moistened with perspiration. * * * The nervous system is early affected by the drug. The motor nerves are paralyzed progressively from the periphery to the central organs. The spinal and central nerves become affected, and inco-ordination, a staggering gait, and vertigo are prominent symptoms of its toxic action. Finally, collapse and death may occur from paralysis of the heart or of the respiration. Poisoning has also followed the application of tobacco leaves to a wound."

Says the *London Lancet*, "No smoker can be a well man."

Said Professor Solly, an eminent London surgeon:

"The profession has no idea of the ignorance of the public regarding the nature of tobacco; even intelligent, well-educated men stare in astonishment when you tell them that tobacco is one of the most powerful poisons we possess. Now is this right? Has the medical profession done its duty? Ought we not as a body to have told the public that of all our poisons it is the most insidious, uncertain, and in full doses the most deadly?"

"Nicotine is not the only poisonous substance present in tobacco, nor, bad as it is, is it the worst

ingredient in the deadly drug. Carbon monoxide gas, prussic acid, and furfural are some of the other poisons of tobacco. Some investigations of the *London Lancet* show that the most injurious forms of smoking are not those in which nicotine prevails, but those in which there is a larger proportion of the irritant aldehydes, particularly the aldehyde furfural, a substance to which many attribute the injurious effects of cheap liquors, and which is commonly distinctive of the smoke from cheap Virginia cigarettes."

Poison in the Old Pipe.

The British Medical Journal calls attention to the fact that if a smoker "resumes the use of a pipe which he has let alone for several weeks, and in which the tobacco juice has become completely dried, he may imbibe a sufficient dose of the poison to cause vertigo accompanied by nausea, sometimes with diarrhea, cold sweats, palpitation, headache, and, above all, by a sense of burning and dryness in the mouth and throat."

The insidious mischiefs wrought by tobacco are usually attributed to almost every cause but the right one.

Is Nicotine Absorbed?

Nicotine is readily soluble in water and hence is easily absorbed. The rapidity with which it is taken into the body and distributed by the blood is shown by the suddenness with which pallor,

nausea and faintness take possession of the boy who for the first time essays to smoke a cigar. Another evidence is afforded by the strong tobacco odor which emanates from the breath and skin of a tobacco user for many hours after the smoking of a single pipe or cigar.

The mucous lining of the nose, mouth, lungs and air passages presents a very extensive absorbing surface, an area of 800 to 2,000 square feet, over which the whole volume of the blood is spread out every three minutes.

It has been shown that one-half of the nicotine inhaled is absorbed. A man who smokes an ounce of tobacco daily may absorb seven to ten grains of nicotine and probably in some instances more.

Dose of Nicotine Fatal to Man.

According to Dr. Copeland, authority on poisons, death has been produced by an enema containing less than a grain of nicotine.

Melsens asserts that the smoke from half an ounce of tobacco contains a fatal dose of nicotine.

A case is on record (*Ann d'Hygiène, 1861*) in which a murder was committed by forcing nicotine into the victim's mouth. Death occurred in three to five minutes.

Krocker reports that one thirty-second of a drop produced giddiness, nausea, vomiting, feeble pulse, intense muscular weakness, difficult breathing, cold extremities, partial loss of consciousness and other symptoms of impending collapse.

A man who committed suicide by taking nicotine into the mouth, dropped instantly to the floor insensible and died in three minutes.

It is generally held that one drop of nicotine is the fatal dose for man. (Gy.)

The usual effects of the first pipe or cigar afford all the evidence needed to establish the status of tobacco as a poison. The fact that these symptoms soon disappear if one continues to use the drug is no evidence that the drug ceases to produce poisonous effects. The so-called "tolerance" established is simply a cessation of the reflex protest. The insidious mischief to heart, blood-vessels, lungs, liver and kidneys continues.

Distoxicated Tobacco.

Gy of Paris, undertook a few years ago, very extensive experiments to determine the facts with reference to denicotinized and distoxicated tobaccos. He showed in a paper presented to the Société de Biologie that 4 c. c. (60 drops) of a maceration of Sweet Caporal, or 5 c. c. (75 drops) of distoxicated tobacco, would produce death. Two c. c. (30 drops) of a maceration of ordinary Caporal tobacco is a fatal dose.

Sweet Caporal is half as toxic as ordinary Caporal. Five parts of distoxicated tobacco produces the same effect as four parts of Sweet Caporal.

Gy showed that the effects of denicotinized tobaccos upon the stomach, liver, kidneys, lungs

and nerves are essentially the same as other tobacco, though their toxicity may be slightly reduced.

M. Lesieur, who made a careful study of this subject, said, "We think it gives the smoker a false sense of security to place on sale a toxic product under the name of denicotinized tobacco, tobacco which contains dangerous doses of nicotine." And Vitoux says that denicotinized tobaccos offer, instead of security against toxic symptoms, a veritable danger because of their reputation for innocuity.

The Toxicity of Oriental Tobaccos.

In the study of Oriental tobaccos, supposed to be less toxic than ordinary brands, Gy found that they possess no special advantages. They produce a very pronounced asthenia (prostration). This was noticed particularly in rabbits.

One subject remained in a state of stupor for several hours, which led to investigation to ascertain whether opium was present. It was not found present, although all Oriental tobaccos may not be free from opium.

Does the Body Become Immune to Tobacco?

It is well-known that the body rapidly acquires a tolerance for tobacco as for opium and other narcotics. Most smokers doubtless entertain the idea that tolerance means immunity; that is, that when no unpleasant effects are felt, no harm is

being done. It is true that there are poisons to which the body may be by training made immune. Such are snake venoms, some poisons produced by bacteria, and various organic poisons. The body may be gradually trained to make antidotes for these poisons, and thus render them inert and harmless; but it was proved by Gy, a French physiologist, that nicotine does not belong to this class. After some use of the drug the body ceases to remonstrate by acute and distressing symptoms, but the mischievous effects continue, steadily, insiduously destroying the fine machinery of the body until heart, blood vessels, liver, kidneys, and other vital organs are so badly damaged that the vital functions can no longer proceed in a regular and normal fashion and then a medical examination reveals the fact, not that the subject has *begun* to suffer from nicotine poison, but that his body *has been ruined by it*. Every cell of the body, every tissue and every fibre, has been damaged. The vital reserve has been exhausted, the defenses of the body have been broken down and the living machine is irreparably injured. It may be possible to patch it up sufficiently to keep it going for a few years, but a large share of its working capacity, its efficiency, has been used up in carrying unnatural and unnecessary burdens and cannot be replaced.

Dr. Gy fully demonstrated that no antitoxin is developed in the blood as the result of using

tobacco. This experiment was made: A rabbit was given full doses of tobacco infusion for several months. The serum from the blood of this rabbit was then injected into the peritoneal cavity of another rabbit. A quarter of an hour later a dose of tobacco infusion sufficient to kill a rabbit in two minutes was given. The effects were just the same as in the animals which had not received the serum. The conclusion is drawn from this experiment that chronic tobacco intoxication does not give to the serum of the individual or of the animal any antitoxic properties. The apparent tolerance is due simply to the fact that the immediate reaction is less violent.

The first effects of the inhalation of tobacco smoke appear only the first time the inhalations are made; *but a study of the effects of tobacco upon the heart and blood vessels by delicate instruments shows that in spite of the tolerance the usual reactions occur*; that is, tolerance does not necessarily imply the absence of reaction, but simply the absence of intolerance. Tolerance means simply the tolerance of reaction.

How Tobacco Disorders Digestion

That tobacco smoking affects the stomach is not a new idea to any smoker who recalls the effects of his first cigar. The nausea and vomiting which the novice experiences, clearly indicate the disturbing influence of the filthy weed.

Evidently tobacco arrests and paralyzes the normal processes of digestion and even reverses the action of the stomach as seen in vomiting.

The pernicious effects of tobacco begin in the mouth. The salivary glands of the smoker are so exhausted that the saliva loses, to a large degree, its power to digest starch, its normal function. The nicotine and empyreumatic oils in the smoke blunt the sensibility of the nerves of taste and smell and so destroy the gustatory reflex and lessen the formation of "appetite juice," which Pavlov showed to be essential to normal digestion.

Tobacco in small quantities has no effect upon the saliva, but in large doses interferes with its action. This has been shown by Gy and Calcaterra.

Roger has shown that there is a close relation between the functions of the salivary glands and the pancreas.

These facts explain the gastro-intestinal disorders and the disturbances of assimilation which are very commonly seen in smokers.

Tobacco, by incessant irritation, predisposes to mucous plaques and cancer. On this account syphilitics are forbidden to smoke.

Tobacco smoking unquestionably encourages cancer of the lip by maintaining chronic irritation.

Granular pharyngitis and catarrh of the throat, sensibility to cold and dryness of the throat, are symptoms commonly observed in smokers.

Huchard calls attention to the effects of tobacco on the diaphragm, causing hiccough.

The paralyzing effect of tobacco upon the stomach is well shown in the abolition of hunger. The Turk takes opium to abate the pangs of hunger when food is not attainable. Sailors and others use tobacco for the same purpose. (Combe.)

Cannon and Carlson have shown that the sensation of hunger is associated with contractions of the stomach, the so-called "pangs" of hunger. Tobacco abolishes these contractions by paralyzing the stomach and in this way destroys the sensation of hunger. This fact has been established by Carlson, who showed that in old smokers as well as those not accustomed to use tobacco, hunger pains and gastric contractions cease under the influence of smoking. Carlson's observations were made on a man with a large gastric fistula like that of Alexis St. Martin, and on specially trained subjects.

Cramer proved that smoking slows the movements of the stomach.

Pouchkine concluded that tobacco increases the quantity of gastric juice, but lessens its acidity, lowering the proportion of hydrochloric acid and diminishing the activity of the rennet ferment, and so does not aid digestion but hinders it.

Osler observed loss of appetite in dogs dosed with nicotine.

Tobacco smoke passed through a solution of pepsin or gastric juice lessens the rapidity of the action of pepsin. The addition of an infusion of tobacco to gastric juice produces a still more marked injurious effect.

Nicotine causes exaggeration of peristalsis and may give rise to diarrhea.

Tobacco Dyspepsia.

Persons who smoke in the morning before breakfast, even very moderately, are likely to suffer from gastric symptoms, while others who smoke only after meals, to a much greater extent escape.

The prolonged use of tobacco contributes in a very marked way to the development of gastric disturbances.

Cramer reports finding in old smokers complete absence of gastric acid.

The Effect of Tobacco Upon the Intestine.

Laurent reports the following case: A man 27 years of age, robust physique, began smoking

cigarettes at the age of 23 years. It took him a long time to become accustomed to their use. At the end of six months he suffered with diarrhea, which resisted all treatment. He stopped smoking, and in less than eight days was well. Fifteen days afterwards he again began smoking, and the diarrhea reappeared at once. He repeated this experiment four times with just the same results.

Another case reported by the same author: A student of 23 years, habitually of good health, has never experienced, any digestive trouble. Has good appetite, and bowels normal. When this young man, who does not smoke, finds himself in an atmosphere saturated with tobacco smoke, he is seized at once with diarrhea, which does not stop so long as he continues to inhale the tobacco smoke.

Smoking Destroys Appetite.

More than forty years ago Hammond called attention to the fact that the use of tobacco lessened the consumption of food. On this account it was claimed to be a means of economizing food. To this argument the writer urged the unanswerable argument that life is due to tissue change. Without change, without consumption of energy, there is vital stagnation. The less activity, the less life. Anything that lessens tissue change, the

assimilation and disassimilation of food, lessens life.

Lord Rhondda, the British Food Controller, is reported as saying in defense of tobacco for the army, "Men would eat a great deal more if they did not have tobacco." Doubtless this is true; and they would accomplish "a great deal more." And the *Sun* said, in promoting its pernicious Tobacco Fund:

"It used to be said against tobacco and coffee that they were devils because they killed the appetite for food. Now, for the same reason, they are angels. *Heroes drink a cup of Rio, grab a cigarette and go over the top.*"

It has not been shown that tobacco and coffee make better soldiers. Whisky was once thought to be necessary for the fighting man. In the Great War, the American soldier fought without spirits and certainly showed no inferiority to either the English Tommies who were well supplied with rum, or the Germans who were fairly inundated with beer. And there were many soldiers who did not smoke and showed superiority in marching and fighting power to those who did, as many officers will testify. General Miles, a well seasoned soldier, is a non-smoker, and during the war stated to the writer that he regarded tobacco as an enemy to the soldier. The general stated that he abandoned the cigar when he saw

General Grant in the last stages of smoker's cancer of the throat.

It is evident then, that tobacco can be in no way an aid to digestion. Its influence can be only in a high degree detrimental. The notion that an after-dinner cigar aids digestion is wholly without scientific foundation.

The deleterious effects of tobacco upon digestion are doubtless in part due to its effect upon the sympathetic nerves.

Pouchkine has shown that tobacco lessens the secretion of gastric acid (HCl) by the stomach and the activity of the gastric juice and so greatly hinders digestion.

The Damage Tobacco Does to the Liver.

The first pipe or cigar would probably prove a fatal dose except for the fact that the liver possesses a remarkable function by means of which it is able to destroy the poisonous properties of the nicotine and other poisons derived from tobacco.

This distoxicating power of the liver resides in its cells. Alcohol, creasote, morphia, the poisons produced by putrefactive bacteria, in fact, all organic poisons, are acted upon by these wonderful cells in such a way as to destroy or very greatly decrease their pernicious qualities.

It is for this reason that when a drug is given by hypodermic injection only half as large a dose is required to produce a given effect as when

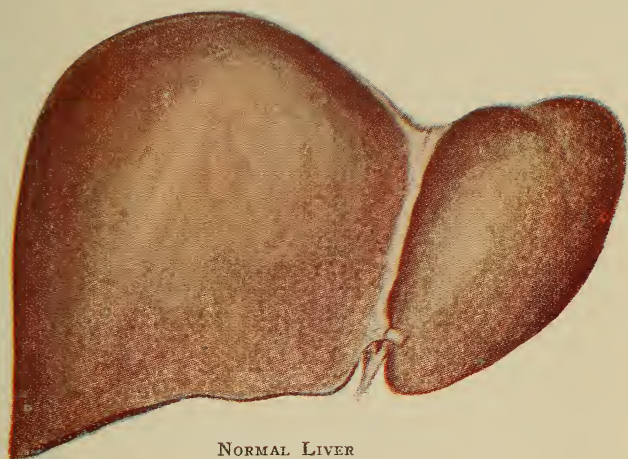
given by the mouth. When injected under the skin the poison enters the circulation at once; when taken by the mouth, most of the drug passes through the liver and is distoxicated by it. Even when injected under the skin the poison is largely captured by the liver and destroyed, although more slowly and less completely.

This wonderful distoxicating power of the liver was demonstrated by Roger, a pupil of the famous Bouchard, many years ago.

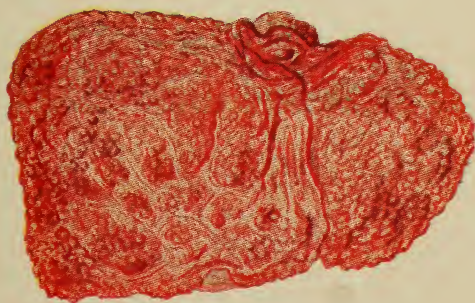
The experiments of Roger, Charrin, and others, brought to light the curious fact that this distoxicating power of the liver is much greater after a meal than before, and led to the demonstration of the important part played by sugar or starch in the liver function. After a meal rich in farinaceous foods, the liver cells are well filled with an animal starch known as glycogen, which is known to be essential for the distoxicating activity of the liver.

This physiological fact explains the observation of Brooks that "there is a universal and well founded belief that the use of tobacco on a full stomach is less likely to produce symptoms than on an empty stomach."

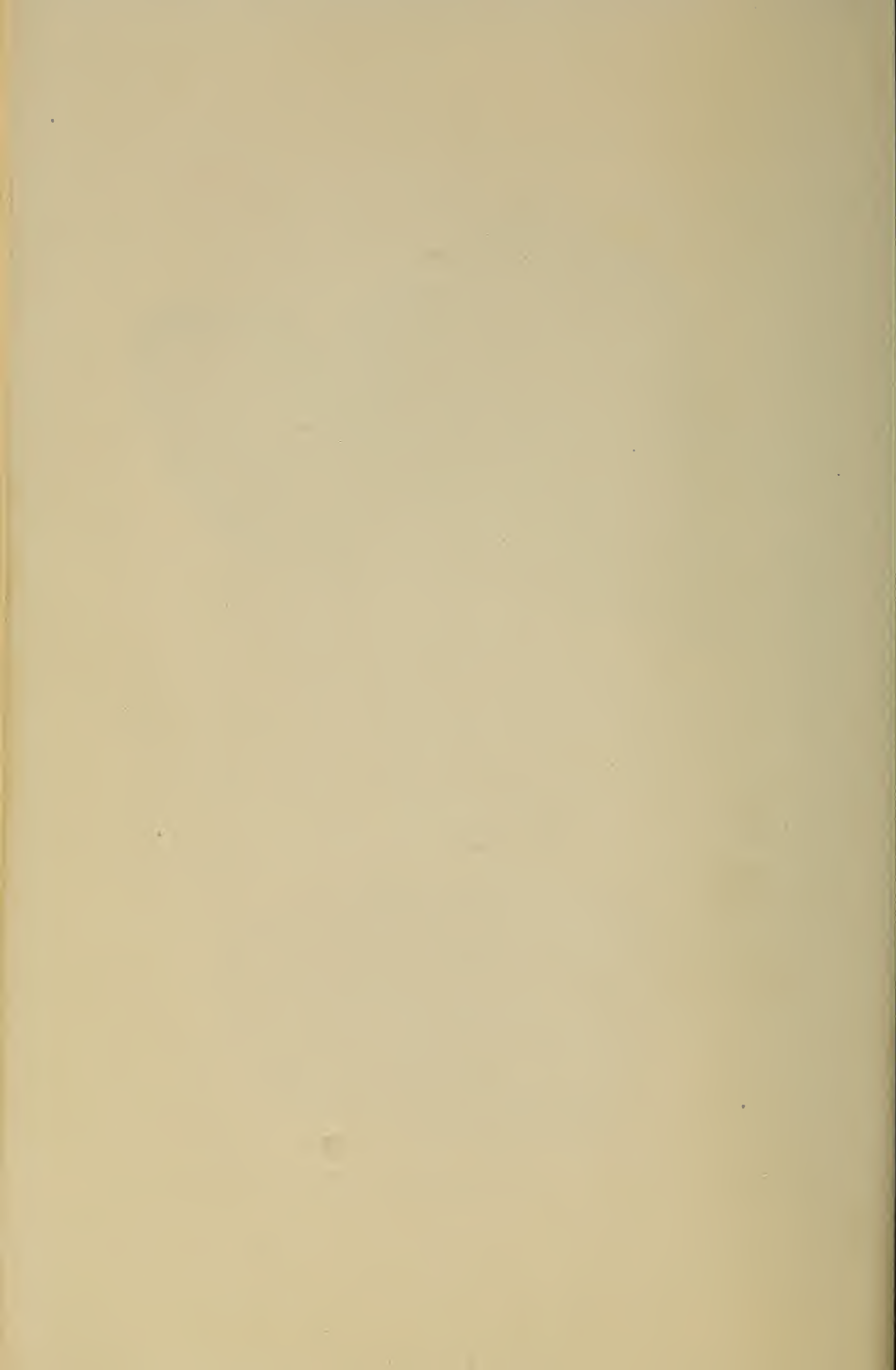
If the liver were able to destroy all the nicotine imbibed by smokers and to continue to do so for an indefinite period of time, the smoker might indulge his pipe with impunity and without stint. Indeed, some smokers seem to possess an almost unlimited liver capacity and to be able to distoxi-



NORMAL LIVER



TOBACCO-DESTROYED LIVER



cate almost unlimited quantities of nicotine. They are blessed with wonderful livers and are able not only to smoke almost constantly, to drink any amount of whiskey, to indulge their appetites without restraint, and yet maintain a marvelous degree of efficiency and manifest an astounding ability to resist the ravages of time.

These men owe their unusual tolerance of tobacco and other poisons to the fact that they possess extraordinary livers which are able to do double or quadruple duty as poison destroyers. That they cannot be cited as proof that tobacco is harmless, is clearly enough shown by the fact that for every one possessed of this unusual tolerance to poisons because of his extraordinary endowment with capacity for poison destruction, there are many hundreds who demonstrate their lack of this unusual natural protection by succumbing to the poison habit at an early age.

It must be remembered, also, that the liver plays a highly important part in the process of digestion. It works over and refines, so to speak, the crude products of gastric and intestinal digestion. When compelled to devote its energies to the destruction of nicotine, it cannot do the work of digestion properly. Crude and waste elements accumulate in the blood and tissues, and are eliminated in lessened quantity. This accounts in part for the lessened endurance of smokers.

It is difficult to demonstrate the effects of tobacco upon the liver, because the human liver is exposed to so many other possible causes of injury.

Stern (1907) thinks that tobacco may produce elementary glycosuria, and that a mild diabetes may be aggravated by the use of cigarettes. He even attributes certain cases of diabetes to nicotine poisoning.

Graziani showed that tobacco causes changes in the liver, particularly hemorrhages and areas of necrosis (death of tissue).

Adler showed at the end of two months enlargement of the liver and infiltrations indicating the beginning of sclerosis. These conditions were increased at the end of four months. The connective tissue was dense. Fatty degeneration was also present.

Fatty and sclerotic changes in the liver have been noted by Gy and others in experiments upon animals as the result of chronic nicotine poisoning.

The Destructive Effects of Tobacco upon the Lungs

The lining of the air tubes and cells of the lungs presents an extraordinarily extensive absorbing surface, about 1000 square feet of surface under which a volume of blood equal to all the blood in the body courses every minute. Through the extremely delicate covering of this "respiratory field", gases of all sorts pass into the blood with the greatest facility. So rapid is this absorption that nicotine or any other poison introduced into the body in gaseous form enters the blood and saturates the tissues far more quickly than when introduced in liquid form into the stomach or by hypodermic injection.

A single cigarette may contain a grain of nicotine, at least half of which enters the lungs and in part, at least, the blood. A cigar contains three or more times as much tobacco as the cigarette, but less nicotine is absorbed because the smoke is not inhaled.

Besides the nicotine there are all the other poisonous products which are always present in smoke, creasote, pyridine, Prussic acid, furfurol. The complacency with which smokers and sometimes non-smokers, ladies, perhaps, often sit for hours in a room the air of which is blue with tobacco smoke, is an evidence of the blunting effect of nicotine upon the normal sensibilities. Smoke from any other source

would not be tolerated. Yet smoke is smoke, and tobacco smoke does not differ essentially from other smoke except by the addition of nicotine, and other poisons much worse than those of ordinary smoke.

The well-known irritating effects of smoke upon the respiratory membranes easily explain the injurious effects from tobacco smoke observed in the throats of smokers.

Smoker's sore throat is a condition very familiar to throat specialists. The highly irritating and injurious effects of tobacco smoke in cases of chronic disease of the throat and lungs from other causes is also well known. So long as the patient continues to smoke his throat maladies are incurable; but from the moment he lays aside his pipe or cigar, recovery begins.

It is largely through the injury inflicted upon the naso-pharyngeal mucous membrane that smoking impairs the hearing and the sense of smell.

Sir Morell Mackenzie, the famous London throat specialist, is quoted by a London author as saying that:

"In considering the evils produced by smoking, it should be borne in mind that there are two bad qualities contained in the fumes of tobacco. The one is the poisonous nicotine, and the other is the high temperature of the burning tobacco. The cigarette, which is so much in vogue nowadays, is most certainly the worst form of indulgence, people being tempted to smoke all day long, and easily ac-

customing themselves to inhale the fumes into their lungs, and thus saturating their blood with the poison."

And again, "Unfortunately it is not necessary to smoke to be a victim of tobacco. Many persons find their neighbors' pipes or cigars very trying, and, for a person with a delicate throat, exposure to an atmosphere laden with the fumes of tobacco is even worse than smoking."

Smoking Leads to Consumption.

The unusual liability of cigar workers to tuberculosis or lung consumption has long been noted. Attention has even been called to the danger of contracting the disease through the use of cigars by reason of the liability of infection through handling by persons suffering from the disease.

In a paper read by the author by request before the National Association of Life Underwriters, at its meeting in New York City (1918), attention was called to certain statistical facts which seem to show that tobacco is a potent factor in causing pulmonary tuberculosis in men. It was shown that for every 100 females who die of tuberculosis, there are 137 male decedents, an excess of 37 per cent, although the excess of males in the population is only 2 per cent.

It was further shown that,

"Up to the period of 25 years, however, the female decedents are greatly in excess of the males, show-

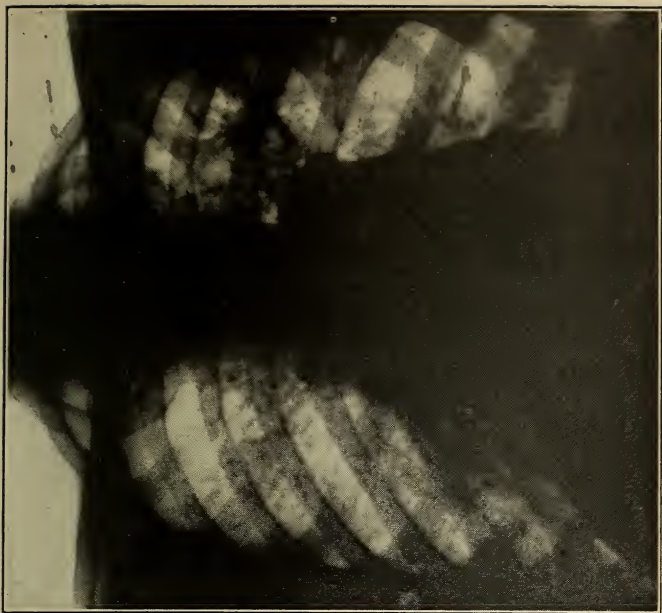
ing 122 female deaths to 100 males. Beginning with the twenty-fifth year, however, the figures are reversed, the disparity steadily increasing to a maximum of 243 male decedents to 100 female decedents at the age period of 50-54 years.

"The average for the entire period from 25-70 years is 166 male deaths from lung tuberculosis to each 100 female deaths .

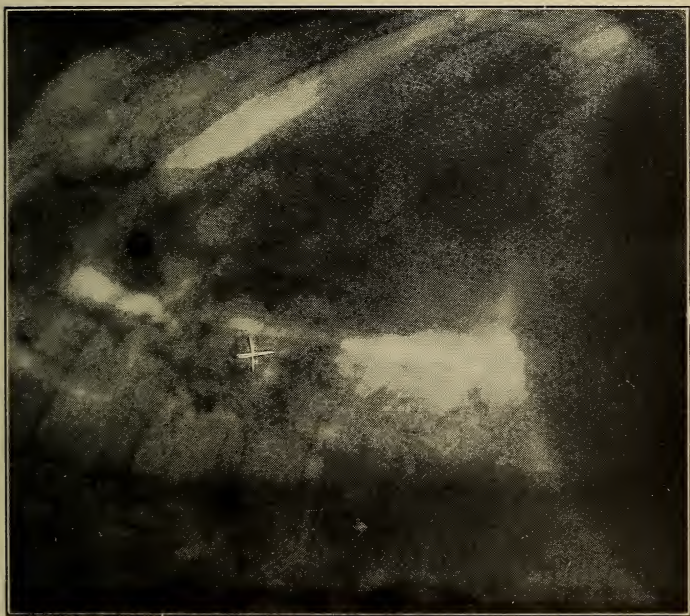
"There certainly must be some definite reason for this very great preponderance of male decedents from an infectious disease. That the male constitution is not more susceptible than the female is shown by the preponderance of female decedents during the first twenty-five years of life, the period of greatest susceptibility to infectious disease. In 1915, between the years of 25-70, male deaths exceeded female deaths to the enormous number of 14,791, or one-fourth of the total number of decedents. During this period, one-fourth of the total number of deaths were due to lung tuberculosis.

"Another point which should be mentioned in this connection is the fact that in certain parts of the country, Michigan, for example, while tuberculosis is on the whole decreasing, the decrease is wholly due to the lessened mortality of females from this disease, since the mortality of males is actually increasing.

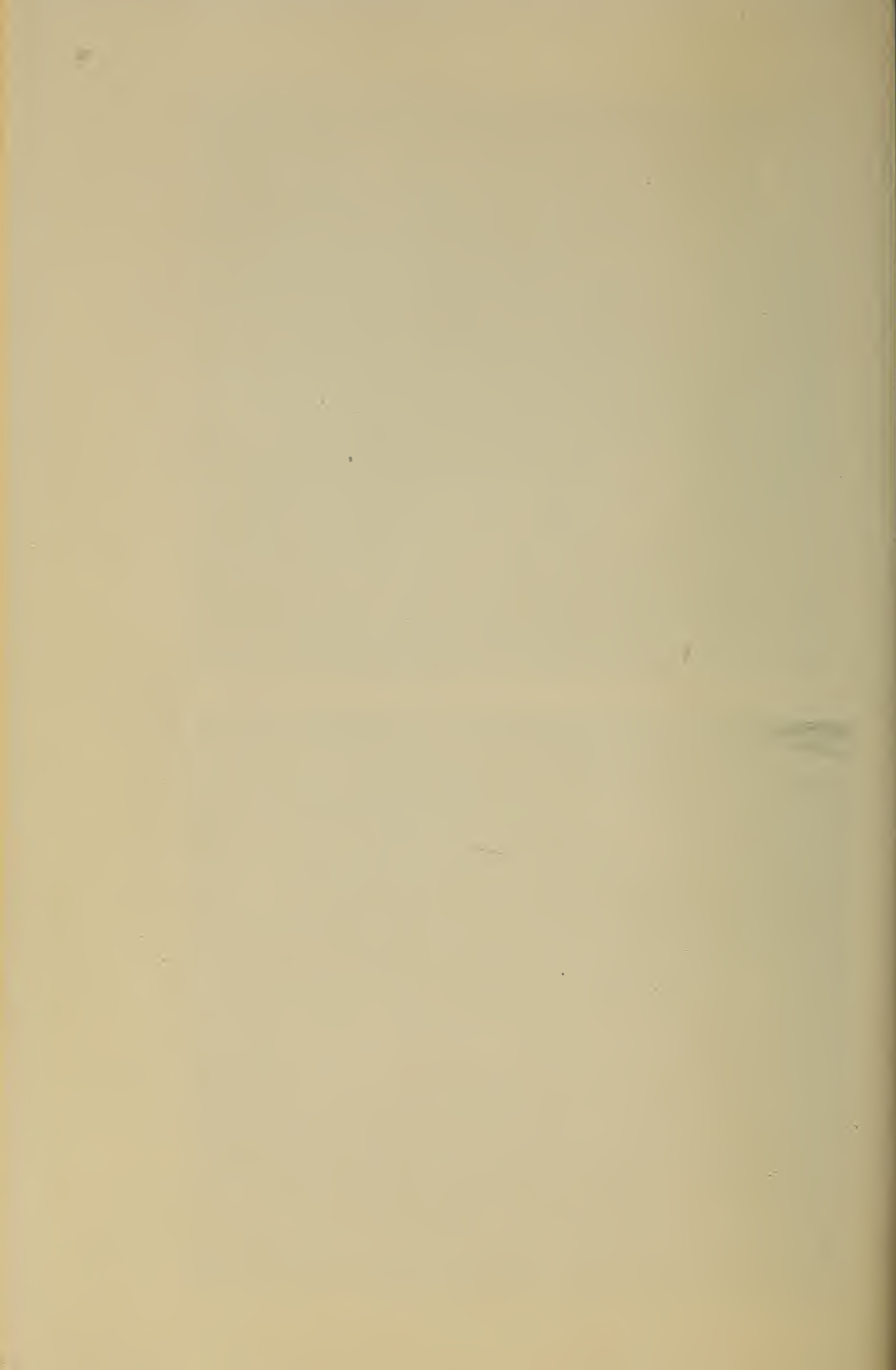
"The fact that lung tuberculosis is increasing in males is very significant when associated with another fact; namely, the enormous increase in the



TUBERCULOUS LUNG (X-RAY)



DISEASED (CALCIFIED) ARTERIES (X-RAY +)



consumption of tobacco, especially in the form of cigarettes, within the last few years. The increase of tuberculosis in man runs parallel with the increase of the consumption of tobacco."

The Fourth and Fifth Reports of the Phipps Institute of Philadelphia for the study and treatment of tuberculosis present strong evidence of the damaging influence of tobacco in the battle against this most dangerous enemy of human life. The "Fourth Report" (1907) says,—

"We have merely evidence as to the influence of tobacco on the development and mortality of tuberculosis and not upon implantation. The preposterous claim that has been made that tobacco is a preventive of tuberculosis implantation can not be maintained in the presence of the statistics of a large number of tobacco users who have developed tuberculosis. *More than two-thirds of the males who applied for treatment used tobacco in one form or another.* The statistics here given, if they have any meaning at all, would seem to indicate that the use of tobacco has a predisposing influence for the implantation of tuberculosis. In fact, the extensive use of tobacco by males may be one of the explanations why tuberculosis is at present so much more prevalent among males than among females.

"The damaging influence of tobacco in tuberculosis is probably exercised through the circulation. Tobacco undoubtedly depresses the heart and interferes to some extent with vigorous circulation. It is generally conceded that anything that depresses the cir-

culation interferes with nutrition and consequently predisposes to tuberculosis both in implantation and development."

The Fifth Report (1908) gives us the following most significant facts which have never been invalidated or disputed:

"We now have statistics for two years on the use of tobacco. During the fourth year 73.01% of the males used tobacco and 26.98% did not use it. For the current year (Feb. 1, 1907, to Feb. 1, 1908) 78.95% used it and 21.04% did not use it. During the fourth year 61.80% smoked only, 8.38% chewed only, and 29.81% both smoked and chewed. During the current year 63.77% smoked only, 7.18% chewed only, and 29.04% both smoked and chewed.

"As with alcohol, so with tobacco, the mortality was much greater among those who used it than among those who did not use it. During the fourth year 18.58% of those who used tobacco died, as compared with 5.15% of those who did not use it; and during the current year 15.30% of those who used tobacco over those who did not use it is as great as the excessive mortality among those who used alcohol over those who did not use it.

"Alcohol and tobacco give no protection against tuberculosis, as has been claimed by some people. The striking preponderance of mortality among patients who used alcohol and tobacco as compared with those who did not use them, moreover, warrants abstinence on the part of all who are suffering from tuberculosis in active form."

Dr. Wright of St. Mary's Hospital, London, found that nicotine greatly lowers the tuberculo-opsonic index, one of the most delicate means of measuring the resistance of the body to the tubercle bacillus. In one case reported by Wright, that of a cigarette smoker, the index was reduced to zero. The patient died three weeks later.

Dr. Webb, a famous lung specialist, of Colorado Springs, observed in the examination of thousands of soldiers at the various camps during the war, that cigarette smoking is an active cause of chronic bronchitis. He reported the finding of "ronchi" in the lungs of nearly all smokers. Ronchi mean irritation, and irritation means low resistance, an open door to tuberculosis.

Tobacco asthma is well known (Gy).

Destructive Changes in the Heart and Blood-Vessels Caused by Nicotine

Adler and Hensel (1906) injected 15 deci-milligrams of 1 to 200 solution of Merck's nicotine intravenously ($1/12$ of a cigarette $1/40$ of a grain). After 18 injections marked changes in the aorta made their appearance. These changes involved the entire aorta to the ileac bifurcation. They became most marked after 38 to 50 injections.

Gebrowsky and Papadia (1907) observed similar changes in the aorta.

Gy observed that the effects of nicotine are less marked than those of tobacco for the reason that nicotine does not represent all the poisons found either in tobacco or tobacco smoke.

Boveri observed atheroma of the aorta and hypertrophy of the suprarenal capsules (degeneration of the kidney).

Bylac obtained identical results and observed also aneurisms of the aorta and calcareous plaques (arteriosclerosis) in a rabbit weighing two kilograms, which was given in the course of 38 days, 35 c. c. of a ten per cent infusion of tobacco by intravenous injection.

Lesieur (1907) observed lesions of the aorta as the result of subcutaneous injections of infusions of

French and English tobaccos. The atheroma (calcareous degeneration) was most often found at the arch of the aorta.

The appearance of these lesions is always the same, whether produced by lead, tobacco, adrenalin, oxalic acid or digitalis.

The atheroma is, according to Josué, a process of defense. There is first a simple thickening of the elastic and muscular tissues of the artery. Later degeneration occurs because of disturbance of the circulation.

Claude Bernard made a microscopic study of the effects of nicotine upon the blood-vessels of a frog's foot. He found that the vessels contracted so strongly that they were completely emptied of blood.

Lauder Brunton and others have shown that nicotine is a powerful vasoconstrictor.

The violent chill sometimes observed in guinea-pigs after injections with infusion of tobacco, were thought by Claude Bernard to be the same sort of effect as that produced by the ligature of an artery in preventing blood from entering a muscle in causing trembling of the muscle.

Fleig and de Visme have shown that tobacco, no matter in what way introduced, always causes a formidable elevation of blood pressure. This is due to the direct action of nicotine upon the muscular walls of the vessels. Later, this vasoconstriction is followed by a paralytic vasodilatation.

Gy observed changes in the arteries in two cases as the result of the use of Caporal tobacco.

Boveri produced atheroma in 10 rabbits out of 16.

Degeneration of the Large Arteries

Baylac obtained the same results in 5 rabbits out of 8; Gebrowsky in 7 rabbits out of 9.

Hypertrophy of the heart is a natural result of the raised blood-pressure.

Examination of the heart tissue showed, in dogs (Favarger), degeneration of the heart muscle.

Gebrowsky found lesions of the ganglia of the heart.

Brooks made postmortem examinations of fifty-four tobacco users and found damaged heart muscles in nearly every case. Fatty and fibroid degeneration and brown atrophy were most common.

The Smoker's Heart.

There are three characteristic symptoms of tobacco heart, one or all of which may be present; viz., pain, shortness of breath, rapid and often irregular heart action.

The heart is a muscle. The blood-vessels are muscular tubes connected with the heart. The heart and blood-vessels may be properly regarded as one organ, having for its function the distribution of the blood to the tissues and the renewal of tissue wastes.

The task performed by the heart is much greater than is generally realized. It expends one-tenth of

the whole bodily output of energy in lifting the 120 foot tons which constitute the average day's work of the heart.

The heart is a pump, the arteries the distributing pipes, the veins, the return pipes. When the arteries are contracted or obstructed, the work of the heart is increased and the blood-pressure is raised.

The heart is controlled by nerves which give to it a rhythmic movement and regulate its action to suit the needs of the tissues.

The blood-vessels are also controlled by nerves which regulate their size and their activity. A constant adjustment of the work of the heart is necessary to meet the changing conditions of the blood vessels. Upon the constant and regular action of this finely adjusted mechanism, all the processes of life depend.

Old age is essentially due to the wearing out of the heart and blood-vessels. An eminent French physiologist very truly said, "A man is as old as his arteries."

The effect of tobacco upon the heart has been most carefully studied by many physiologists. All authorities agree that tobacco is a heart poison. A very small dose increases the work of the heart by contracting the arteries and raising the blood pressure. This effect is produced not only in beginners but in old smokers. It is the result of the influence of tobacco upon the nerves which control the heart and blood-vessels.

A single cigarette or cigar causes a rise of ten to fifteen points in the blood-pressure (Brooks, Jane-way). This means an increase in the work of the heart amounting to more than ten per cent. That is, the heart has to lift 132-foot tons instead of 120-foot tons,—twelve tons of energy thrown away. This loss (estimated for the whole time) amounts to one per cent of the whole energy of the body. Of course a single cigar will not produce a permanent effect, but after some years the habitual smoker's blood-pressure is permanently raised and not ten to twenty points only, but fifty, seventy-five, and even a hundred points. The work of the heart is doubled or more than doubled.

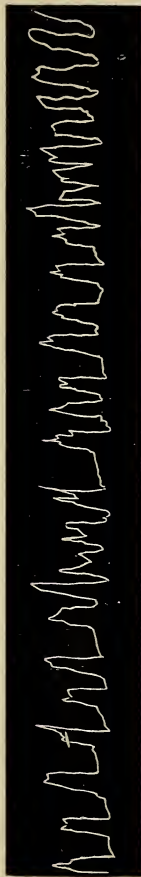
The electrocardiograph is an instrument of extreme delicacy by which morbid conditions of the heart may be detected and studied through a graphic record of the electrical currents generated during the action of the heart. The accompanying cuts show the normal sphygmograph tracing and that of a smoker suffering from myocarditis due to tobacco.

Overwork of any bodily organ always leads to premature senility and failure. The overworked heart early becomes the seat of degenerative processes.

Claude Bernard, the great French physiologist, was first to notice the contraction of the blood-vessels caused by nicotine. Bruce, Miller, Hooker, Hirschfelder, all noted the same. The effects are the same on beginners and old smokers (Brooks).



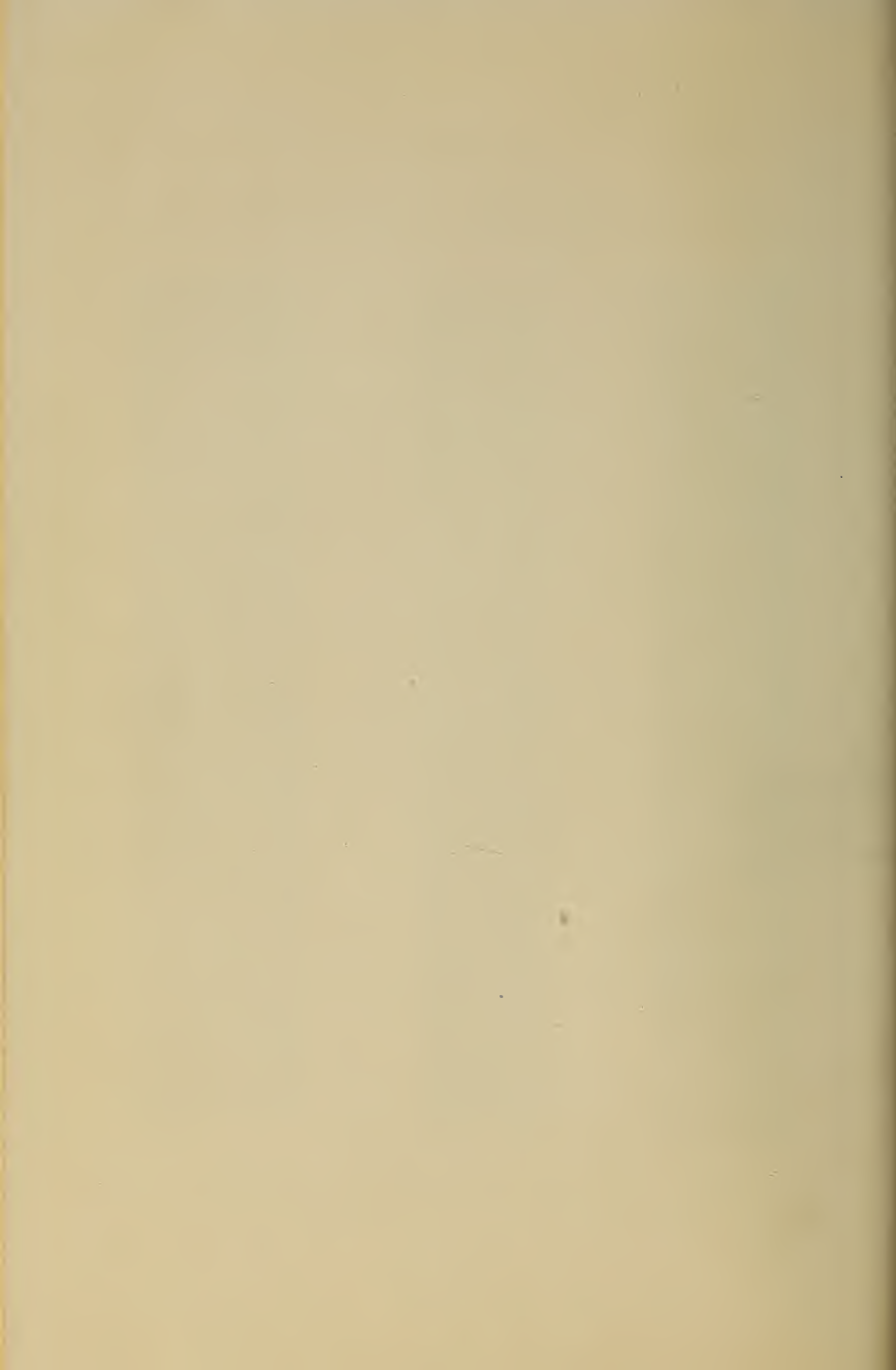
NORMAL PULSE—EACH VERTICAL LINE REPRESENTS A HEART BEAT



IRREGULAR PULSE OF TOBACCO HEART



A SMOKER'S PULSE



M. Julin (*Zeit. f. Exp. Path u. Therap.*, Berlin, 1913) called attention to the fact that smoking always raises the diastolic pressure. This point is highly important. The diastolic pressure represents the work the heart has to do to open its valves and before it can send any blood into the arteries. The higher the diastolic pulse the more energy the heart must waste. The rise is due to contraction of the small arteries caused by the nicotine circulating in the blood.

Said the late Dr. Janeway, an authority on blood-pressure:

"Tobacco, or its alkaloid nicotine, has a powerful action on the circulation. Nicotine, in less than overwhelming dose, produces an immense augmentation of blood-pressure in animals, due to stimulation of both central and peripheral vaso-motor mechanisms (Cushney). Cook and Briggs have called attention to the temporary elevation of arterial tension during smoking. They found it most marked when a strong cigar or old pipe is used, and continuing an hour or more after the smoke is ended.

"Dr. John, in the clinic of Volhard at Dortmund, made a study of the influence of tobacco smoking on the circulation. His blood-pressure measurements indicate that the smoking of two 'medium' cigars evokes characteristic alterations in arterial pressure in typical cases. Even during the act of smoking there may be evidence of rise in diastolic pressure, and the effect may persist as long as two

hours. Eight or ten Russian cigarettes give a result comparable with two 'medium' cigars.

"These experiments confirm the impression that nicotine can produce vascular alterations in the sense of sclerotic changes. We may argue as we will that habitual smokers have consumed extraordinary quantities of tobacco over long periods without signs of vascular change, but we are in duty bound to take cognizance of careful blood-pressure measurements. 'Indifference to scientific evidence is an intolerable attitude.'" (*Jour. A. M. A.*, 1914).

Calling attention to the fact that chewing, more than smoking, through absorption and hemolysis, causes an acidosis of the blood which increases blood pressure, Dr. Daniel Lichty says:

"The *high blood-pressure* will account for some of the flights of genius and descents into iniquity of some great minds otherwise blameless. *Tobacco toxemia is more to blame than alcohol*. A man usually knows when he is drunk, but rarely knows when he is tobacco-inebriated."

Boveri gave nicotine to rabbits for eighty-four days and found hardening of the blood-vessels.

Cases have been observed in man in which there seems to have been no evident cause for an *extensive arteriosclerosis* other than excessive smoking." (*Jour. A. M. A.*, 1909).

Tobacco Angina Pectoris.

The pernicious effect of nicotine upon the heart is shown by the experiment of Rouget, who noted

that when the heart of an animal which has been killed with chloroform is touched with a concentrated solution of nicotine, the heart contracts very strongly, showing the remarkable irritating influence of nicotine upon the heart.

Angina pectoris, a highly painful disease of the heart, is due to constriction of the vessels of the heart itself.

Tobacco causes temporary constriction of the vessels with the pain and other agonizing symptoms characteristic of angina pectoris.

A similar contraction of the arteries of the arms and legs as well as of the pancreas has been noted, and an eminent Vienna physician has recently pointed out that contraction of the vessels of the intestines and other abdominal organs, with extreme pain, may be due to the same cause.

These anginal pains sometimes appear with the first cigar (Brooks), but usually develop later.

The heart nerves do not become accustomed to the drug by use, but on the contrary, become sensitized so that the poisonous effects are produced by smaller doses than at first. Brooks relates a case in which a heavy smoker had become so sensitized that he could not enter a room containing tobacco smoke without being seized with an anginal attack.

The anginal attacks produced by tobacco have proved fatal (Huchard).

Irregularity of the pulse is one of the character-

istics of "smoker's heart." This is believed to be due to contraction of the arteries of the heart.

Authors have recognized for a long time the existence in smokers of such symptoms as neuralgia and angina pectoris.

Tobacco angina of the chest has been described by Huchard and many other authors. Numerous cases have been reported.

Huchard cites a case of a man of 42 years, an officer, previously in excellent health. No alcoholic excess. No disease. He had smoked since he was 18 years old and for 20 years had smoked from 30 to 60 cigarettes a day of Caporal tobacco. He died suddenly after breakfast one morning. The post-mortem showed death to have been due to an attack of angina of the chest induced by smoking.

Huchard reports another case of a physician of 28 years who smoked continuously, lighting one cigar from the preceding one. He began suffering from attacks of angina, which came on every night during sleep, producing a sensation of sudden suffocation with restriction of the chest, and pain running into the left arm. He was frightened at these attacks and stopped smoking. Within a month the attacks disappeared and did not return.

According to Huchard, these attacks are due to spasm or sclerosis of the arteries of the heart.

Heart symptoms due to tobacco are often encountered in smokers. The symptoms are especially produced by fatigue and are most likely to show

themselves in old smokers; they may appear whether tobacco has been used in excess or not. The most prominent symptoms are vertigo, malaise, sleeplessness, slow pulse, sometimes intermittent pulse. These symptoms are often very distinct, sometimes continuing for a year or two after the use of tobacco is suspended.

Chapman, of England, long ago (1892) described as "tobacco heart" a hypertrophy and dilation of the heart due to tobacco. The action of tobacco upon the blood-vessels is not less marked than its effect upon the heart.

Huchard and Robin held that the changes in the blood-vessels are the result of the increased blood-pressure.

Smoking not only encourages changes in the blood-vessels but aggravates the effects of various other causes which may be in operation.

Eid (1900) observed, during a visit to Corsica, numerous cases of aortic lesions in persons who had been great smokers. In two of them suppression of tobacco brought complete disappearance of the heart symptoms.

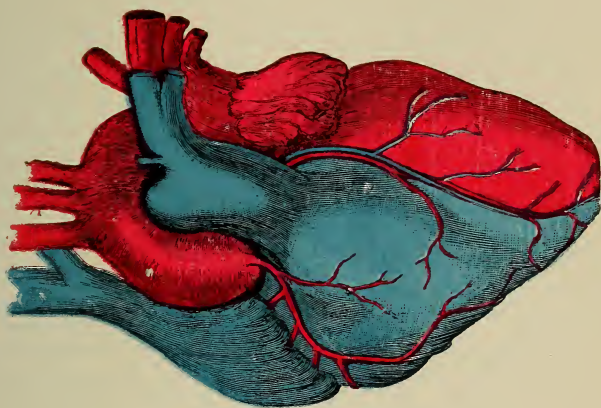
Disorders of the blood-vessels due to tobacco poisoning are much more frequent than heart troubles. In these cases the affected person may feel in his legs after a few steps various pains, such as sensations of weight, of ants crawling, cramps, and heaviness. Sometimes the feet and legs become white, at other times the color of wine. There is no

change in the reflexes or in sensibility. The pulse is small and frequently cannot be felt at the tibial arteries. The patient is suddenly obliged to stop when walking. After a little while the pain ceases and he can go on. Soon all the symptoms reappear. These symptoms, which often coincide with other signs of arteriosclerosis, may be confined to one limb, usually the left leg. At length dry gangrene may occur in a toe or the entire foot. Sometimes the symptoms are less pronounced. A single artery may be affected without the nutrition of the whole limb being disturbed.

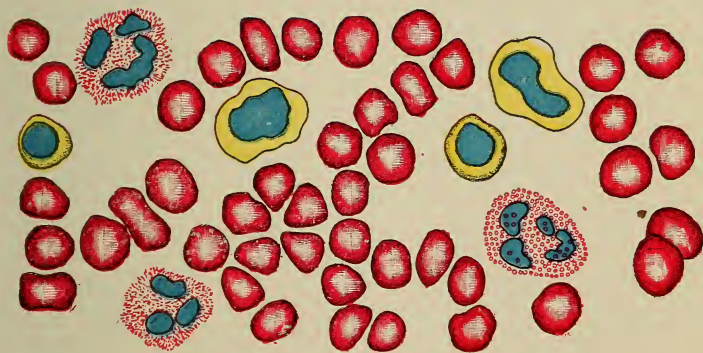
The cause of these symptoms is easily understood. Tobacco produces spasm of the arteries, which diminishes the blood supply. This hindrance is hardly perceptible when the limbs are in repose. When an increased supply of blood is required by exercise, the deficiency of blood appears, with intermittent claudication. One step farther and the more advanced symptoms appear.

Dr. Willy Meyer has recently recorded numerous observations which seem to show very conclusively that the use of tobacco is the chief cause of this condition commonly known as "intermittent claudication."

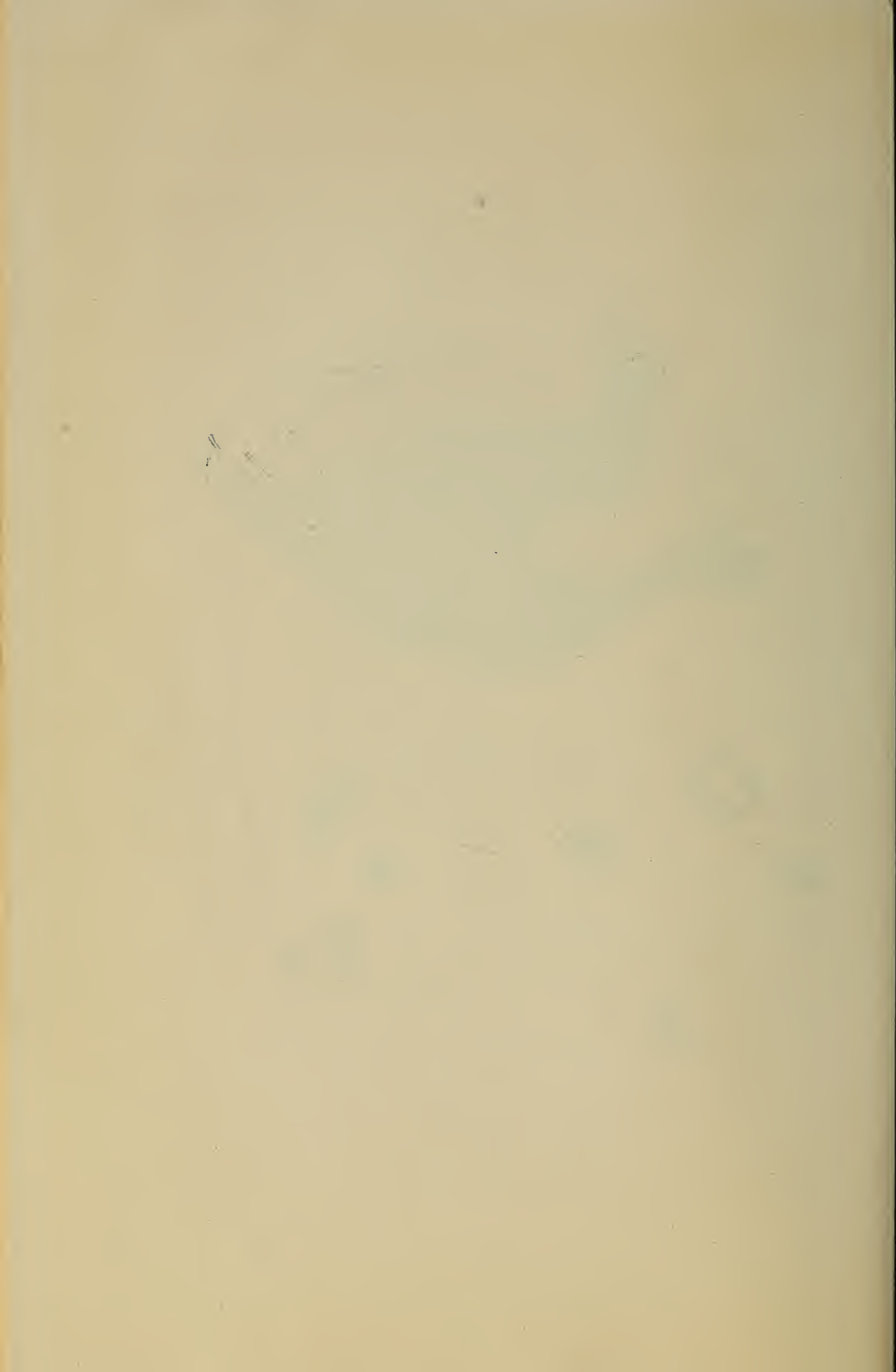
The fact that this disease, also known as *thromboangutis obliterans*, is practically unknown in women, is held by Dr. Meyer to be strongly confirmatory of his view that smoking is the principal cause of the disease. He regards the *pyridine* of tobacco smoke as second only to nicotine in its baneful effects.



THE HEART



RED AND WHITE BLOOD CELL



Of all the causes of this form of angiosclerosis, tobacco is the most frequent. In 45 cases observed, Erb found only 7 who would not confess to having smoked. Thirteen smoked moderately, 10 smoked much, and 15 smoked excessively.

The Old Smoker's Heart.

That the effects of tobacco upon the heart are not lessened by use, is well shown by the observations of J. W. Payne and G. A. Dowling (Fisher and Berry), who found that smokers have constantly a higher pulse rate than non-smokers, due to weakening of the heart muscles.

Another evidence of heart weakness in smokers was the fact that after exercise the pulse rate returned much more slowly to the pre-exercise rate. For example, in smokers the pulse rate did not return to normal at the end of fifteen minutes after exercise, whereas in non-smokers the average time was only five minutes.

"That soldiers in this war smoke to excess is, I think, unquestionable; and in the treatment of 'irritable heart' the limitation of pipe and cigarette smoking should, I submit, constitute *a leading item*." *Kenneth Macleod, Brit. Med. Journal.*

Dr. Osler (*Lancet*, 1910) calls attention to the increase of angina pectoris, the result of the rapid growth of the tobacco habit in women in recent years.

Dr. Osler states that death may occur from tobacco angina pectoris and cites the cases of three of his friends, apparently strong, healthy men, incessant smokers, all of whom died suddenly from the effects of tobacco on the nerves of the heart.

Huchard and others believe that tobacco angina pectoris may be due to arteriosclerosis of the arteries of the heart produced by the continued action of nicotine.

Says J. Rochard: "I have met cases of angina pectoris chiefly among persons living in an atmosphere of tobacco smoke."

Soldier's Heart.

Among the irregularities mentioned as due to tobacco are extrasystole (extra beat), palpitation, and "heart block," a condition in which the auricles and ventricles of the heart beat at a different rate (*Jour. A. M. A.*) These irregularities are the ordinary symptoms of "soldier's heart," which not a few physicians believe to be only another name for "tobacco heart."

The condition known as soldier's heart has been long recognized. The British government appointed in 1864 a committee to investigate heart conditions in the army. They recommended the use of a certain brace. The brace was supplied but made no change. In 1876 an army surgeon suggested that the setting-up drill might be the cause. Investigation showed this also to be an error because the

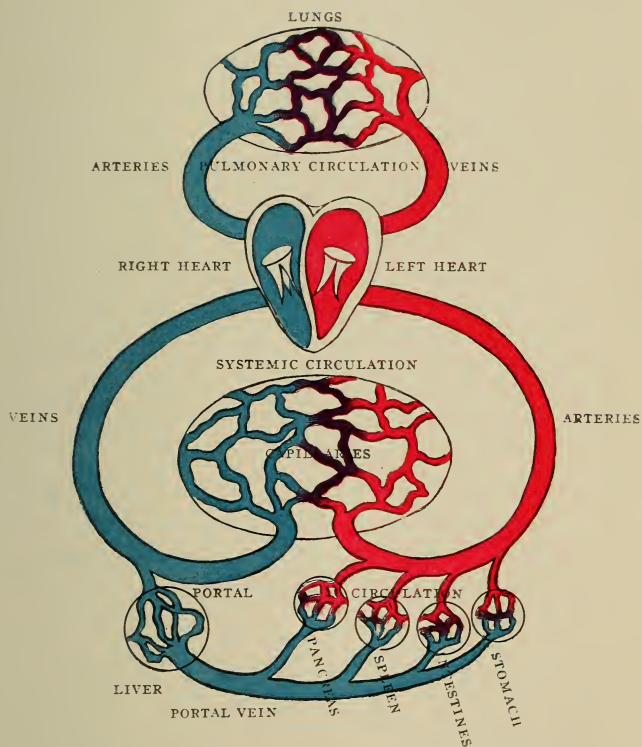


DIAGRAM OF THE CIRCULATORY SYSTEMS



same condition was met in men who had had no drill. (*British Medical Journal*, 1916).

A Captain in the British Army suggests in the *British Med. Jour.* (Mar., 1916) that:

"This question of cigarette smoking will probably be seriously considered one of these days because of the number of men who will be invalided with tobacco hearts, called possibly by other names, all of whom will claim pensions as having been injured by war service."

Every smoker, soldier or civilian, suffers from tobacco heart. The young smoker has acute tobacco heart so long as he is under the influence of the drug. The effect disappears within a day or two when smoking is suspended. The best trained sprinter can not run well after smoking a cigar or cigarette because of the depressing effect upon his heart. The old smoker has chronic tobacco heart. His heart is weak from chronic nicotine poisoning when he smokes and when he does not smoke. It is permanently damaged. He is never a good runner because of his enfeebled heart. He has a poor wind.

Nicolai of Berlin has made a careful study of the effects of tobacco upon the heart and vessels and states (*Zeitscfter. f. Exp. Path. und Therap.* 1910) that "In chronic tobacco poisoning we find besides the affections of the digestive tract, air passages, nervous system and eye, *distinct changes in the heart and blood vessels*. Palpitation, irregular and

increased pulse rate in inveterate smokers were known long ago. Dornblosth mentioned in 1877 that cigar makers suffer from palpitation of the heart. Favarger distinguishes three stages of poisoning: 1. Palpitation or in its stead painful sensations in praecordium or epigastrium. 2. Slight symptoms of insufficiency, corresponding to the 'weakened heart.' 3. Asthmatic attacks.

"Erb noted a connection between arteriosclerosis and tobacco, and Bamberger observed an attack of angina pectoris, with other manifestations of arteriosclerosis, in a 'wet' smoker of forty."

"No part of the body can escape a poison that is circulating in the blood day and night. The nervous system suffers and the muscles become tremulous. But the heart is the chief sufferer in both the beginner and the confirmed smoker." (Tidswell.)

The Medical Record (1917) calls attention to an important paper by Tullidge in "*The Military Surgeon*" in which the opinion is expressed that "tobacco smoking, especially cigarette smoking, is largely responsible for the various cardio-vascular disturbances" from which soldiers suffer.

Parkinson of London, a noted heart specialist, found the average pulse rate nine beats higher during smoking than before, and noted that smoking is an important factor in the breathlessness and anginal pain connected with "soldier's heart."

Smoking has become so nearly universal among soldiers, we need not be surprised at the report of

Rehfishch who made a study of hundreds of cases and found weakening of the heart muscle in 70 per cent of all the cases.

This author found disease of the blood-vessels, arteriosclerosis of the arteries of the heart, in 43 per cent of all the cases examined, even in subjects between 20 and 30 years of age.

Said the late Lauder Brunton, a very eminent English physician, "Tobacco seems to bring on an affection of the heart characterized by extraordinary irregularity. A curious point about it is that *very little tobacco will keep up this irritability.*"

Since the government in every way encouraged the use of tobacco by soldiers, even going so far as to add it to the rations, it is quite fair to inquire whether the soldier is not as much entitled to consideration for tobacco injuries as for bullet wounds or any other bodily damage incident to the military service.

The Destructive Effects of Tobacco on the Blood.

Vas found the red cells reduced from 5,800,000 to 2,400,000 (very pronounced anemia). The white cells were doubled in proportion.

Petit, Clark, and others obtained similar results.

The white blood cells defend the body against the attacks of germs. They repair injuries and perform other important functions. In the words of Holy Writ, "The blood is the life." Tobacco disintegrates the white blood cells as well as lessens their power to combat germs. It is thus a poison which invades the very citadel of the body.

Tobacco and Bright's Disease

The duty of the kidneys is to remove from the body certain poisonous wastes which are in part the result of the activity of the body cells and in part are derived from outside sources. The normal fluids of the body are slightly alkaline. Anything that lessens the normal alkalinity of the blood and tissue fluids, damages the body cells. To prevent a dangerous accumulation of these acid poisons, the kidneys must remove them as fast as they are generated by body work or as they are absorbed from the stomach or intestines or taken in through the lungs. To do this important work each kidney is provided with about 2,000,000 delicate cells, which possess the power of recognizing and removing poisons from the blood. Each of these cells secretes in the course of a lifetime of sixty years, one tablespoonful of urine.

This highly delicate poison eliminating machine is easily damaged. The concentration of poisons in its cells and delicate drainage canals, exposes them to special injury. When overworked the cells are injured and are easily destroyed. Sudden damage of the kidney is acute Bright's disease; a gradual destructive process is chronic Bright's disease.

Fortunately a person may live and apparently enjoy good health even when one kidney has been destroyed by disease. Even two-thirds of one kid-



NORMAL KIDNEY



TOBACCO-DESTROYED KIDNEY



ney may do the ordinary scavenger work of the body, but a person with such a reduced kidney capacity has no margin of safety with which to meet emergencies. Any unusual demand for extra kidney work will exceed his kidney capacity and the result will be disaster, dropsy, renal congestion, suppression of urine, even uremic convulsions and death. Many persons are living close to the edge of such a catastrophe, but with no consciousness of their danger. Albumen and casts are evidences that the kidneys are being destroyed, but their appearance does not mark the beginning of Bright's disease; it indicates that the destructive process has been long at work and that a complete breakdown is impending.

Naturally, as Gy observes, the kidneys suffer less than does the liver. This is doubtless due to the fact that nicotine reaches the liver first and that the liver, in part, at least, distoxicates the nicotine and other tobacco poisons, thus lessening their power to damage other organs.

Gebrowsky observed in animals subjected to tobacco smoke, nephritis with hyaline casts.

Gy observed albuminurea in four cases, also changes in the convoluted tubules and hyaline casts.

The kidneys suffer less than the liver for the reason that they are protected by the antitoxic action of the liver. This is especially true in the case of nicotine, for which the liver has a special affinity.

The damaging effect of smoking upon the kidneys is indirect through its influence upon blood pressure, as well as direct.

Fleig and de Visme showed that tobacco produces a very pronounced contraction of the vessels of the kidney, an effect which directly lessens the efficiency of the organs by diminishing the blood supply.

Nicotine is a highly irritant poison; and tobacco smoke contains in addition to nicotine several other highly poisonous and irritant acid smoke products which impose a great burden upon the kidneys and slowly destroy them. The smoker is quite unconscious of the mischief that is being done until the damage has become so extensive that the kidney fails in its function, and then irreparable injury has been done.

However, a critical examination will show in any old smoker, evidence of the injury which tobacco is doing to his kidneys. The examination of large bodies of men made by the Life Extension Institute, has revealed the fact that a large proportion of men in active business life show evidence of disease of the kidneys which in most cases may be attributed, in part, at least, to the tobacco habit.

When Alexander III. of Russia, the father of the present Czar, was found to be suffering from Bright's disease, many persons became anxious on their own account. A French medical journal described what happened in Paris at the time. A large number of the business men of Paris went to

their physicians and asked for an examination. This resulted in the revelation that 10 per cent of the men examined, persons who were apparently in good health, already had Bright's disease.

Dr. Munro, of Scotland, an eminent physician, some years ago, made careful tests of the urine of 100 smokers, taking them just as they came, and he found that 10 per cent of them had albumen in the urine. These smokers were already victims of Bright's disease without knowing it.

When a man smokes, the poisons taken in must be eliminated somehow. Part of the poison passes out through the lungs, and the odor can be detected in the breath. Some is eliminated by the skin, the perspiration sometimes staining garments yellow. But by far the greater part is excreted by the kidneys, which first become congested, and then degenerated and diseased, the condition commonly known as Bright's disease.

That the notable increase in the mortality from Bright's disease in recent years is in large part due to the use of tobacco is at least suggested by the fact that for every 100 females who die of Bright's disease, 132 males die. The influence of tobacco seems to be very clear when we analyze the statistical facts.

At the age period of 10-14 years, the number of female decedents rises to 148 per 100 males, and female deaths exceed male deaths in the succeeding age periods to the period of 35-39, when the two

classes of deaths become equal. After this period, an excess of male deaths develops rapidly, reaching 140 males for 100 females at 50 years, and continuing at a high figure for the following fifteen years. Evidently, the danger to the kidneys associated with child-bearing is so great as to overbalance during the age limits which cover the child-bearing period of women the pernicious influence of these etiological factors which render male adults at the other periods more subject to Bright's disease than females.

That this notable excess of mortality in males from renal disease is chiefly attributable to the use of tobacco and alcohol may be fairly inferred from the facts which have been presented in relation to the excess of male deaths due to disease of the arteries. This view is further confirmed by the fact that while there was, between 1910 and 1915, an increase in the mortality of females from Bright's disease amounting to 7.4 decedents per 100,000 of the population, the male decedents increased 11.5. That is, for every increase of 100 female decedents from Bright's disease, there was an increase of 165 male decedents.

The above figures speak eloquently in condemnation of the cigar and the cigarette. If the use of tobacco by men is not the true explanation of their greater mortality from disease of the kidneys, it must be admitted that no other explanation has been offered.

Effects of Tobacco upon the Brain and Nerves

A man may become intoxicated or drunken from the use of tobacco as well as alcohol. Professor George B. Woods in his great work on "*Therapeutics and Pharmacology*" refers to several cases of delirium tremens produced by tobacco. Any poison may cause intoxication.

Tobacco, like alcohol and opium, acts especially upon the nervous system (Campbell). Dr. Frankl-Hochwart, after a careful study of several thousand cases, states that "the localization of the toxic action of nicotine is much like that of syphilis," that is, upon the nerves and blood-vessels.

Recent studies of the brain and nerves by the refined methods of the modern laboratory, show that every irritant poison produces immediate damage of the fine structures of the brain, lessening the acuteness of thought and the quickness and accuracy of nerve activity. The use of tobacco in the smallest quantities is more or less damaging to the brain and nerves, lessening nerve sensibility and mental acumen. The free or prolonged use of tobacco is recognized as one of the most common causes of insanity. Neurasthenia, and a great number of chronic nervous disorders may be directly traced to the use of tobacco in a very large number of cases.

"Tobacco has a powerful influence on the nervous system, and I have known a case of an abstainer, with a male inebriate heredity, who trembled like a man with delirium tremens every morning until he had a pipe to steady him." (*Dr. Norman Kerr, "Inebriety," p. 129.*)

Unsteadiness of the nerves or "trembling" is one of the most common effects of smoking. It is most marked in the morning. After a while it becomes permanent. It usually disappears when the smoking is discontinued. It is very similar to the trembling due to the use of coffee. It is especially noticed in writing or other fine work, and is often apparent in the handwriting. The lower extremities are affected in a similar manner. It is not unusual to observe in smokers the next day after they have smoked more than usual, a certain hesitation in walking—a lack of precision in placing the feet upon the ground. Certain authors speak of tobacco ataxia.

Vertigo a Very Common Symptom in Smokers

Dr. Bremer, of St. Louis, late physician to St. Vincent's Institute for the Insane, in a paper entitled "*Tobacco Insanity and Nervousness*," asserts that "the boy who smokes at 7, will drink whisky at 14, take morphine at 20 or 25, and wind up with cocaine and the rest of the narcotics at 30 and later on."



TOBACCO-DAMAGED NERVE CELL



HEALTHY NERVE CELL



Dr. Bremer very aptly calls attention to the fact that a drug capable of producing the extremely poisonous effects observed in a person not accustomed to its use and of setting up such vital disturbances as give rise to blindness, disease of the heart, etc., must be capable of producing sooner or later "one or the other forms of insanity." The nerves of the eye are simply extensions of the brain itself. If tobacco can produce such changes in these as to produce blindness, why may it not effect other portions of the brain likewise? The more recent authorities upon the effect of tobacco, alcohol, and other irritating poisons upon the brain, have shown changes which have been formerly overlooked. It is now known that tobacco, as well as alcohol, has the effect to destroy the delicate branches of the nerve cells and the minute buds with which they come in contact with other cells, thus communicating thought, sensation and impulses.

Tobacco Epilepsy.

Dr. Bremer has met a number of cases of epilepsy in which the disease was apparently produced by the use of cigarettes, and the influence of tobacco upon the disease was clearly manifested by the fact that the free use of tobacco was generally immediately followed by an unusually severe attack of epilepsy.

Tedeschi observed a case of epilepsy in a man aged 32 and healthy until three years before,

when he had a seizure resembling an epileptic seizure, and, after a few days' interval, a few more. He was in the habit of smoking sixty or seventy cigarettes a day, but did not drink and had no history of venereal disease. On suspension of smoking he had no further attacks for two or three years. Believing himself cured, he began to smoke again, when, suddenly, on the street, he had a complete and severe epileptic seizure, with loss of consciousness and biting the tongue.

In a second case, the man of 29 did not smoke, but chewed tobacco almost constantly. He developed typical epileptic seizures, but had no more after giving up the use of tobacco.

Gy showed in the rabbit, especially, that intravenous injections of tobacco infusions or smoke water produced convulsions and experimental epilepsy, followed by partial paralysis of the hind legs. He also showed that marked changes took place in the nerve cells, particularly in the chromatic substance.

"Peri reported in 1906 that workers on tobacco die mostly from lesions in the circulatory system, especially from changes in the cerebral arteries. All these data sustain the assumption that tobacco is able to induce actual epilepsy in certain rare cases, even in the absence of a special predisposition." (*Journal A. M. A.*, May 5, 1917.)

Tobacco Neurasthenics.

Tobacco neurasthenia is most frequently encountered in young men, especially clerks and others employed in offices and those following other vocations of a sedentary sort. The well-known effect of tobacco upon the sympathetic system, renders it especially active in the development of the neurasthenic state.

In experiments on animals the physiologist habitually makes use of nicotine as a means of paralyzing the sympathetic nerve.

Apropos of this phase of tobaccoism, the *British Medical Journal* (December, 1918), has this to say:

"Since the commencement of the war, tobacco has obtained far too great a hold upon the community generally, but I doubt whether the medical profession has fully appreciated the craving which neurasthenics have for tobacco, and especially in the form of cigarettes. A most prejudicial vicious circle becomes established, and, as one patient so truly confided to me, the inhalation of cigarettes is one of the causes of this disability. Neurotic patients who are candid with themselves and their medical advisers recognize this fact; but their loss of self-control prevents their breaking the habit. It is for the medical profession to assist them. But much more good might be achieved in the line of prevention by some authoritative pronouncement which would save a large number of susceptible subjects from drifting unawares into nervous depravity."

Tobacco not only produces neurasthenia, but is a dangerous refuge for the neurotic in which he finds after temporary relief, a great aggravation of his miseries and a drug enslavement from which he seldom escapes if he does not fall into greater depths of drug addiction which it seeks out with unvarying certainty.

The toxic effect of tobacco upon the sympathetic nervous system is shown by the nausea, vertigo, and great depression generally produced by the first pipe or cigar in the "would-be" devotee of the drug. Trembling of the hands, intermittent beating of the heart, shortness of breath and loss of endurance are effects which regularly follow the habitual use of tobacco. No intelligent trainer will permit a man preparing for an athletic event to make use of tobacco in any form. A large proportion of young men who are refused admission to the army at the recruiting bureaus are rejected because of neurasthenic symptoms due to the use of tobacco. The man whose nerves are unsteady and who cannot work without his pipe or cigar has already become a tobacco neurasthenic.

There are tobacco users who notice so little effect from the drug that they can dispense with the usual pipe or cigar without inconvenience. Such persons may not become neurasthenic, but will sooner or later develop toxic symptoms, such as high blood-pressure, albuminuria, or some chronic affection of the heart, lungs, or nerves.

Dr. L. P. Clarke (*Medical Record*), mentions among symptoms of tobacco poisoning which are commonly overlooked, the following indications of nerve injury:

Leg weariness, pains in the calves of the legs, and even joint pains and irregular or localized nerve pains.

Profuse perspiration on least exertion, especially of the palms of the hands, with the tendency of the hands and feet to be cold.

Tobacco Headache.

Von Frankl-Hockwart examined 800 smokers and found one in five suffering from headache. Vertigo, sleeplessness, inability to work without smoking, ill-humor, depression, worry, impulsive ideas and weak memory were other common symptoms.

Loss of Word Memory.

Dr. Goodhart, an eminent nuerologist, "reports a case of amnesia in a professor of law in a leading university. Family history negative, alcohol and specific infection excluded. No evidence of arterial degenerative change. But the patient had always been a constant excessive smoker of specially selected, strong tobacco for which he had such a predilection that he sent to Porto Rico for it. At the time of the occurrence of the amnesia (loss of word memory), he was much debilitated as a result of intense mental applica-

tion, and an emotional upheaval due to affairs of a personal character, and had been seeking solace in tobacco. *Withdrawal of all tobacco and general rest and nutritional care was the sole treatment.* For several years after, *periodic excesses in tobacco indulgence were followed by slight amnesic attacks, responding at once to abstinence.*" (*Journal A. M. A.*, 1913.)

Von Frankl-Hochwart mentions among other nervous symptoms due to tobacco, difficulties in speaking and writing, defects of word memory, aphasia, neuralgia, sciatica and various forms of genital weakness.

Says Dr. Syms Woodhead, of Cambridge University, England (*Popular Science Monthly*, 1910):

"Cigarette smoking in the case of boys, partly paralyzes the nerve cells at the base of the brain and this interferes with the breathing and heart action. The end organs of the motor nerves lose their excitability, next the trunks of the nerves and then the spinal cord. In those accustomed to smoking, it has a soothing effect upon the nervous system, but often acts as a nervous stimulant to mental work, as in reading. In those cases the effect is not due to nicotine itself, but to the stimulus of the smoke on the sensory nerves of the mouth, which reflexly stimulate the vaso-motor system and dilate the vessels of the brain. There appears to be less irritation of the brain structure and motor nerves than of the sensory nerves, but the power of fine co-ordination is decidedly lost."

A factory manager whose business involves many details, recently stated to the writer that on one occasion when he had renounced smoking for six weeks, he found after two or three days that his memory became so retentive, it was unnecessary for him to make memoranda, on which he had formerly been wholly dependent. After being made acquainted with some of the facts presented in this work, the gentleman resolved to discard tobacco permanently.

An extended research for the purpose of obtaining exact data upon the psychologic effect of tobacco, especially its effect upon the mental activities and development of students, has been undertaken by the the Committee of Fifty for the Study of the Tobacco Problem.

This investigation, which has extended over a number of years and has been carried on in a most systematic manner, fully confirms the statement above made respecting the injurious psychologic effects of tobacco. The full report which is most interesting, will doubtless be published shortly by the committee above referred to.

Smoker's Euphoria.

The late B. W. Richardson condemned the use of tobacco and other narcotic drugs, because they produce an "unearned felicity," that is, an illegitimate pleasure.

Only lawful pleasures are safe. The tobacco-user, the drug habitué of any sort, creates an ar-

tificial tickle of mind or nerves by means of a drug, by drawing upon his vital reserve, his capital, the proper function of which is to supply the energy needed to keep the vital machinery going through the years of age weakening and decline.

A peculiarity of these artificial felicities is that they soon cease to be felicitous, and only become rescues from misery. De Quincey drank a pint of laudanum a day. He declared that he did not take the drug because of any pleasure derived from it, but to save him from the misery he suffered without it, which he described as "the very torments of the damned." Not a few tobacco users who have discovered that tobacco does them harm, continue to smoke for the same reason; in other words, they are drug addicts.

Tobacco Lessens Efficiency.

Dr. George Fisher conducted a series of experiments at the Y. M. C. A. College of Springfield, by which he demonstrated that all smokers show a *loss in precision* in feats requiring accuracy of aim. The tests employed were target practice with baseball throwing and rifle shooting. Old smokers showed immediately after smoking one cigar a loss of accuracy amounting to 11 per cent. Non-smokers showed after smoking a loss of efficiency of 13 per cent. After two cigars the non-smokers showed a loss in accuracy of 18 per cent.

The experiments were repeated on five days and

were applied to eleven subjects. Four tests out of five showed clearly the damaging effects of tobacco in feats requiring clearness of vision and perfect muscular co-ordination. That is, accuracy of aim.

Meylan, of Columbia University, in a careful study of 223 college students, showed that "in scholarship the non-smokers exhibited a distinct advantage." Professor Meylan added, "it is generally conceded that the use of tobacco by college students is closely associated with idleness, lack of ambition, lack of application and low scholarship."

Dr. Jay W. Seaver found that of 100 students taking highest honors at Yale, 95 were non-smokers, only five smokers.

It has been stated that an examination of the class records of Harvard University (Baines) showed that for fifty years not one tobacco user has stood at the head of his class, and this notwithstanding the fact that five out of six students are smokers.

An elaborate study of the effects of tobacco upon mental efficiency was made a few years ago by Dr. A. D. Bush, of the University of Vermont. The observations were made upon medical students who were subjected to more than 2,000 separate tests of the most thoroughly scientific character to determine the influence of tobacco upon the senses and upon mental and nervous activities.

The results are thus summarized by the author, (*N. Y. Medical Journal*):

1. A series of 120 tests on 15 men showed that tobacco decreases mental efficiency 10.5 per cent.

2. The loss in the field of imagery was 22 per cent.

3. Marked losses occurred also in the fields of perception and association.

4. The greatest injury was done by cigarettes.

5. Nicotine was always found in cigarette smoke.

6. Pyridine was found invariably present in tobacco smoke.

Tobacco Inspiration.

Said Colonel S. S. McClure when asked by the writer what he would do with a certain problem, "I don't know. I would spread the matter out before me on a table and sit down and *wait for a flash.*"

Every successful writer knows what the editor meant by a "flash"—a spark, a rocket, a comet or a shooting star right out of the "blue," dashing up out of the subconsciousness, the source of all our mental product, the place where ideas are made.

The most fertile moments, the time when one gets a veritable meteoric shower of ideas is when awaking from a completely restorative sleep. When one ends a period of sleep in which the

fatigue poisons and all the rest of the obstructive rubbish have been washed out of the brain and strained out of the blood by the kidneys, the automatic machinery of the mind is in efficient working order; the wireless receiving instrument is perfectly "tuned," and star showers of ideas break readily into consciousness.

This is one of the things the smoker loses. He wakes with his head in a fog. He gets no flashes, no star showers. His mind is blank until he gets his pipe or his cigarette started. Then he begins to get pictures, pipe pictures, smoke inspirations which he mistakes or substitutes for "flashes", and he very naturally drifts into the idea that smoking helps his imagination and that he cannot write without it.

That tobacco aids the literary worker is an error. The writer has proven this many times. A good case in point is that of the late lamented Jacob Riis, one of the most beautiful characters it has been our fortune to meet. Mr. Riis had suffered for years from angina pectoris, a painful and serious heart trouble of a sort which is often produced and is always much aggravated by tobacco. But he continued to smoke thinking that he must do so to keep his imagination going so he could write. After some persuasion, he made the attempt to dispense with his cigars and in a letter to the writer, stated that he found he had been deceived. He discovered that his imagination

worked far better without the narcotic. After a few weeks' abstinence, he said in a letter to the writer, "I find I was mistaken about tobacco. I have just finished the best thing I ever wrote and without a sniff of the weed."

A pipe inspiration is a poor substitute for a real flash out of the "blue."

Robert Louis Stevenson was an inveterate smoker, and died from a malady of which tobacco is a frequent and potent cause. He knew very well the evil effects of smoking, but had become a slave to the drug. He told Thomas Russell Sullivan, when asked about his way of working, "one ought never to write after drinking, and it is better, I believe, to write without smoking—but I can't." He was a cigarette addict, and died at 45.

Tobacco Blindness.

Nicotine is a poison to the optic nerve or nerve of sight. Its continuous use during a long period of time often results in the production of blindness through destruction of the nerves of sight. This destruction is not complete, but lessens the efficiency of the eye to a marked degree by paralyzing the nerves of sight in such a way as to lessen the visual field. The condition of the visual fields is easily discoverable by certain tests and is a highly valuable test for the effects of tobacco not only upon the nervous system, but of the body in general.

Many authors report cataract of the eye in horses eating food containing tobacco seeds. This has been observed in Australia and in Virginia.

Parsons and Pandi, also Walicka, have observed degeneration of the optic nerve.

Langley and Anderson demonstrated the development of amblyopia in rabbits as the result of tobacco poisoning.

McKenzie, one of the pioneers in the scientific treatment of diseases of the eye, so long ago as 1840, declared the use of tobacco to be "a frequent cause of amaurosis."

Dr. Schweinitz names as the cause of amblyopia or axial neuritis, the use of tobacco and alcohol and states that of all substances "tobacco is the one most responsible."

The same author reports the case of a woman who did not smoke but who worked in a tobacco factory and who suffered from amblyopia (sudden blindness in this case). The patient quickly recovered after she left the factory.

This form of blindness is most common in old smokers, those who have indulged fifteen years or more. Occasionally tobacco blindness develops in young smokers.

According to Dr. Booth (*Alienist and Neurologist*, 1915), the use of tobacco is the most common of all causes of loss of sight and dimness of vision.

Smokers who experience failure of health from any cause are likely to suffer loss of sight from the

use of tobacco in quantities which had previously been borne without apparent injury.

Color blindness is one of the early symptoms of approaching tobacco blindness. Renouncing the use of tobacco generally results in a speedy cure.

How much tobacco is required to produce tobacco blindness? In a case in the English courts in which a bricklayer suffered from defective eyesight, claimed to be the result of injury to his head by a falling brick, a physician testified that smoking half an ounce of tobacco a week would cause tobacco blindness.

According to the *New York Medical Journal*, a prominent American railway organization has barred tobacco from certain branches of the business because of the liability of smokers to color blindness through the practice of the habit.

The blurring of sight, dilated pupils, and ability to see better after twilight than in full daylight, are all evidences of disease of the nerves of sight.

Another symptom connected with the eye, which the confirmed smoker may often notice, is the long retention of bright images in the eye. If a person looks at a bright object, as a window when the sun is shining out of doors, and then closes the eyes, or looks at a blank wall or a sheet of white paper, he will still see the form of the window, the sash bars, the glass, etc., for a few seconds. If the eyes are in a healthy condition, the image disappears very quickly; but when the nerves of the eye have been

partially paralyzed by the use of tobacco, these images will sometimes remain for several minutes. Old smokers sometimes use this as a means of determining when they have smoked too long. When they notice that images are long retained, they know that the degree of poisoning of the nervous system is reaching the danger point, and lay the pipe away for a few hours.

Tobacco Deafness.

Tobacco users are sometimes afflicted by a peculiar form of ear disease, the chief symptom of which is sudden loud or shrill sounds in the ears. These sounds are sometimes due to an enormous exaggeration of slight sounds, as the chirping of a cricket, the ringing of a bell, or some similar source of sound, but generally the sound is wholly subjective, that is, originates entirely in the ear, and is due to the diseased condition of the auditory nerves resulting from the use of tobacco.

Teran, a famous French specialist, states (*de l'Action du Tabac sur l'Audition*), "My conclusion is that we should not hesitate to warn absolutely against any kind of use of tobacco, under any form, in persons who belong to families where deafness is hereditary, or who have sclerotic lesions. Besides the dangers of neuritis, the tubal catarrh, the frequently recurring inflammatory lesions of the middle ear suffice to aggravate the development of a slowly progressive deafness, which is incurable.

I believe that abstention in these cases may be extremely favorable."

Wyatt Wingrave reports "eight cases of nervous deafness in patients aged between twenty-four and forty years." (*Jour. Am. Med. Ass'n.* 1905).

Why Athletes in Training Do Not Smoke

Athletes, when in training, are never allowed to smoke. Every trainer is familiar with its deadly effects.

Some years ago Dr. W. P. Lombard, professor of Physiology of the University of Michigan, himself a smoker, conducted a lengthy series of observations for the purpose of determining the influence of smoking upon muscular work. The amount of the work done was carefully measured and recorded by means of delicate instruments of precision. The results are thus summarized by the Professor (*Jour. Phys. Vol. XIII, p. 44*):

"The record of these successive observations shows that the effect of one cigar of moderate strength was to lessen the work of which the subject was capable, from 10.4 kilogrammeters (75-foot pounds) to 2.1 kilogrammeters (15-foot pounds), the number of times that the weight could be lifted being reduced from 86 to 12. This occurred, too, at the time of day when the strength is usually increasing. The influence of the tobacco was not felt until more than five minutes after the subject began to smoke, and it increased throughout the hour that the smoking was continued.

"The depressing effect began to pass off very soon after the cigar was finished. A considerable recov-

ery occurred within eleven minutes; but it was not until 72 minutes after the cigar had been laid aside that the strength was completely restored."

Dr. Abbe, a famous New York surgeon, states that at West Point, "smoking was prohibited in 1891, and fifteen years later the summary of medical records shows the great advantage in work and discipline. In college, a group of men subjected to ergograph tests during abstinence and again after four days' smoking, is said to have shown a forty per cent. loss of muscle power. In try-outs for football squads it is said that only half as many smokers as non-smokers are successful." (*Medical Record, Jan., 1916.*)

Said Dr. Seaver, for many years Physical Director at Yale University:

"Every schoolboy knows that when athletes are in training for a contest they are obliged to abstain absolutely from all forms of tobacco. Is this done on theoretical or on moral grounds? Not at all. It is done because experience of many decades demonstrates that when the men use tobacco they cannot do as well as they can when free from its effects. Under the influence of tobacco the young man is less alert, less steady, and has less endurance. No man, when entering a contest, will knowingly and willingly handicap himself.

"The muscle cells are also, apparently, only slightly affected by it, the nerve supply to the muscles

being affected, the practical motor ability is greatly impaired."

The latest advertising scheme of the tobacconists is to publish the pictures of athletes who smoke. Athletes, as a class, are given to self-indulgence when they are not in training, but no athlete smokes when in training. This important fact the tobacco advertisers neglect to mention.

Every man is running a race with Father Time, and is in training for success or failure. The man who smokes will certainly be overtaken by the old man with the sickle sooner than if he had not smoked. Tobacco is a handicap which no man who desires to live as long and efficient a life as possible can afford to indulge.

All Experts Avoid Tobacco.

Says Brooks (*N. Y. Med. Jour.* 1915), "The physician or lawyer, the violinist and the rifleman, have learned to know that before the hour of stress tobacco is a detriment to a high type of performance."

Engineers, scientists and experts in many professions, have learned the damaging influence of smoking and ceased to indulge the weed. (See Preface.) Said Judge Eliot, an eminent lawyer, "I never smoke before I am to address a jury." Said an eminent English physician, when offered a cigar, "No, thank you! I do not smoke; I am a surgeon."

The above observations are abundantly confirmed by the experience of Arctic explorers. An eminent

physician, a professor in a large eastern university, recently stated that in selecting men for his expeditions a famous explorer positively refused to accept a man who used tobacco in any form.

Football Players Avoid Tobacco.

Several years ago (1912) Dr. Frederick Pack of the University of Utah made a careful study of the relation of smoking to the game of football as played by university men. Data was gathered from fourteen State universities and colleges and led to the following significant conclusions:

"1. In the 'try-outs' for football squads, only half as many smokers as non-smokers are successful.

"2. In the case of able-bodied men, smoking is associated with loss of lung capacity amounting to practically ten per cent.

"3. Smoking is invariably associated with low scholarship.

"Smokers furnish twice as many failures and conditions as do non-smokers."

Hon. W. W. Roper, of Philadelphia, an old football player, in a recent number of Collier's says, "Any football player who lets himself get out of condition is exceedingly quick to discover the penalty. About the first thing he learns is to let tobacco and liquor alone."

Why shouldn't the business man, the professional man, the statesman, as well as the sportsman, show

equal interest to protect his body from the evil effects of a drug which is the deadly foe of efficiency, both mental and physical?

In view of the above facts it is certainly in place to inquire whether the college "smoker" is a means of promoting the mental and physical training and the college "culture" which our higher institutions of learning are intended to secure to the youth of the country. The answer is obvious. Thousands of young men have smoked their first cigar after going to college and have found in the cigar the opening wedge to other vices from which the sweet, restraining influences of home and church had previously protected them.

The "smoker" is the enemy of good health, of good scholarship, of good morals. It is fair to say that most college presidents tolerate the "smoker" only because it is so firmly entrenched as a social custom of long standing, that it has acquired almost the dignity of an "institution." Colleges and universities should prohibit the use of tobacco by students. Those educational institutions which do not do this fail to do their duty to the young men placed under their care.

A college president or professor who smokes sets an unworthy example to his pupils and ought to be considered disqualified to bear the responsibilities of an educator and trainer of youth.

Half the newspapers of the country, with thousands of deluded mothers, during the war joined

hands in helping the American Tobacco Trust to conduct an enormous sampling campaign and fairly to smother the American army with tobacco smoke.

The prepared copy which docile newspapers published offered the most inane and silly reasons for sending the soldier cigarettes.

"Soothe the poor suffering soldier in the trenches," was the pathetic wail of the tobacco trust, the most useless and destructive of business activities, rivalled only by opium smugglers and moonshiners.

Try to imagine the board of directors of the Tobacco Trust sitting around in their smoke-filled offices puffing cigarettes and wiping their weeping eyes with tobacco leaves because of their sympathy for the poor American soldiers suffering in the trenches. This hypocritical blubbering is worse than "tommy rot", whatever that is.

Tobacco is a narcotic. The soldier needs the stimulus of good food and fresh air and warmth and the full possession of all his faculties and command of his maximum efficiency.

The soldier's training has for its purpose to prepare him for a supreme effort in behalf of his country.

It is to make him ready to exert at any moment all his carefully cultured strength and skill to meet the assault of the enemy.

To narcotize the soldier is to unfit him for his task, to undo the work accomplished by his long and arduous training.

"But the surgeon administers anesthetics to mitigate the sufferings of his patient," said a college professor, "why not have the same consideration for the soldier?"

That's true, professor, we give anesthetics to our patients *but not to the surgeon!*

The soldier is the surgeon. The enemy is the subject. The more the enemy is soothed the easier to conquer him. But the more the soldier is narcotized, the less his efficiency as a soldier.

It is the testimony of many cigarette smokers that they derive no positive pleasure from smoking. They only smoke because they are nervous and shaky and fly to the cigarette for relief.

Suppose a soldier in the trenches happens to get out of cigarettes just before an assault on the enemy. He is already half defeated by his after-smoke misery.

The cigarette does the soldier no good. It does him harm. It does not lessen his miseries, it adds to them.

The confirmed smoker is miserable all the time unless he is smoking.

The non-smoker is not bothered about cigars or cigarettes. He knows nothing of cigarette miseries. He has better wind, better resistance to disease, a stronger heart, sharper eyesight, steadier nerves, a surer aim, and is able to endure the hardships of the trench without the aid of "soothers", which im-

pair every ability which the good soldier needs to make him a valiant defender of his cause.

In telling of his great privations and hardships in his interesting book, "Outwitting the Hun", Mr. O'Brien has this to say about tobacco:

"It was a mighty fortunate thing for me that I was not a smoker. Somehow I have never used tobacco in any form, and I was now fully repaid for whatever pleasure I had foregone in the past as a result of my habits in that particular; because my sufferings would have been intensified now, if in addition to lack of food and rest, I had had to endure a craving for tobacco."

Will not the good women of clubs which raised money for the tobacco fund to buy cigarettes to "soothe the poor soldier in the trenches" (and incidentally enrich the tobacco trust), now aid in the distribution of literature showing up the evils of the tobacco habit?

Dr. Crafts has well said: "Many a young man who went to the war with clean hands, whose after-the-war career will be blighted by the 'yellow ticket' on his fingers, will chide, if he does not curse, the Christian agencies by which cigarettes were thrust upon him, when he had a right to know from these guides the present and future injury that would result from their use." * * *

The Evil Effects of Tobacco upon Nutrition

Tobacco, like other poisons, profoundly damages the glands of the internal secretions, the so-called "endocrines." These glands control the nutritive processes, the metabolism of the body. The remarkable influence of the secretions of the thyroid, pituitary and adrenal glands upon growth, development and the maintenance of physical and mental vigor, is one of the most interesting and startling discoveries resulting from modern psychologic research.

In addition to their influence upon growth and nutrition, these glands have another remarkable function which is highly essential to the welfare of the body. Together with the liver and certain other organs, they constitute a system of defense against poisons, especially organic poisons, that is, the poisons of animal or vegetable origin.

When the body is habitually flooded with so virulent a poison as nicotine, and other still more highly toxic substances found in tobacco smoke, an excessive amount of work is required of these glands, and they become inefficient not only in the destruction of poisons but also in the performance of their other functions, by which growth is promoted and development regulated. The result is seen in the dwarfing effect of tobacco smoking upon young animals exposed to tobacco smoke and boys who smoke

cigarettes. The same destructive influence is to be observed in adults; but in adults, this destructive influence shows itself in the lowering of efficiency and the shortening of life.

The function of the endocrines, or internal secretions, is to maintain the youthful state of the body. So long as they retain their integrity, senility, or old age, is held at bay.

Tobacco-using shortens life by hastening the appearance of senility and through the same means by which it dwarfs development and hinders growth. The certain proof of this is to be found in the destructive effect of smoking upon the genital glands, which are highly important factors in promoting longevity as well as development.

Meyer (*Medical Record*, 1920) has shown how tobacco damages the parathyroids and the adrenals, two important glands which control growth and nutrition, acting through the sympathetic, for which the poisons of tobacco have a special affinity.

Tobacco Destroys the Sex Glands and Hinders Reproduction.

A cock was placed every night in a chamber in which six grams of ordinary caporal tobacco was burned during the night. Of 48 eggs laid by 6 pullets only 32 hatched (two-thirds). Nine of the chickens died in a few days (28 per cent). The cock was exchanged for another cock that had had no tobacco. Of the eggs laid by the same hens only one in a dozen

was found infertile (8.3 per cent). Of 32 chickens hatched only 4 died (12.5 per cent). The chickens of the tobacco-poisoned cock were meager and feeble and lacked animation and the plumage was rough. These experiments were made by Depierris.

A report comes from Petaluma, California, that many flocks of hens in that region have acquired the tobacco habit. Tobacco dust is used freely in the gardens to destroy parasites. The hens thus come in contact with tobacco and, curiously, have acquired a liking for it; but the poultry men are not at all disposed to encourage this new departure on the part of the hens, for it has become evident that the effect of the tobacco is highly deleterious, since it greatly diminishes the egg production. The poultry men have found that the more tobacco the hen swallows, the fewer eggs she lays.

Petit gave tobacco to guinea-pigs, dogs, cocks and rabbits, both male and female. The tobacco was given in the form of smoke or mixed with their food. The result was *rapid sclerosis of the ovaries and testicles*.

In experiments made by Dr. Gy it was found that the young of guinea-pigs and rabbits subjected to tobacco were generally born dead or died soon after birth. This was found true in the case of all animals experimented upon. A post-mortem examination of the young showed their livers to have undergone the same changes noted in the livers of their parents.

It is well known that nicotine affects smooth muscle tissue; hence it must act injuriously upon the uterus.

Nicotine has been found by various observers in the amniotic fluid of the fetus, also in the milk of nursing animals.

The Effects of Tobacco upon Growth

Tobacco produces general disturbance in nutrition, as indicated by loss of weight.

Roger showed that a solution of nicotine, two parts to the thousand, stopped the growth of certain plants.

Richon and Perrin (1908) injected two young rabbits out of a litter of six with infusions of tobacco. The weight decreased notably. They ceased to grow. When the injections were stopped they rapidly gained their weight and resumed growth.

Fleig subjected young animals to the influence of tobacco smoke. He observed "for a long time, even after the inhalation of the smoke ceased, the animals remained incompletely developed and in a state of very marked inferiority to the control animals."

Certain dog fanciers produce dwarf dogs by administering nicotine to them in some form.

Smoking has the same effect upon boys.

In 1906 a special committee of the House of Lords of the English Parliament, reported a drastic bill to prevent juvenile smoking. The committee called especial attention to the fact that while boys showed many evidences of deterioration, lessened height, and

as professor McKeever informs us, were often observed to be "sallow, sore-eyed, puny, squeaky-voiced, sickly, short-winded, and nervous," no signs of deterioration were noted among girls.

Seaver, who studied Yale students, found that non-smoking students increased in height and in chest girth one-fourth more than the smokers. The increase in chest capacity of the non-smokers was most notable, exceeding that of the smokers by 77 per cent.

The deleterious influence of tobacco upon the young is universally recognized. Of 600 school children half were in one case found seriously impaired, the result of cigarette smoking.

Educators universally condemn the use of tobacco. In many other countries and in several States of this country, laws exist prohibiting the use of cigarettes by minors. This fact is sufficient evidence that the injurious influence of tobacco upon the young is fully recognized and universally conceded.

The Journal of the American Medical Association, the most authoritative and influential medical publication in any language, takes an unequivocal stand against the use of tobacco:

"Prevent its use among the young, and in a few years it will be a habit of the past."

That is, let the old smokers continue if they will 'till the habit kills them off, and in the meantime educate the rising generation to let the drug alone. Education

is the only means by which the tobacco nuisance can be suppressed.

An eminent physiologist recently reported the results of an interesting experiment for the purpose of determining the effects of tobacco smoke upon the development of rats.

The rats were exposed for definite periods, daily, to the influence of tobacco smoke, which was described as having a degree of density about equal to that of the smoke-laden air breathed by the participants in a "college smoker." Little effect was observed upon the rats of the first generation, but the second generation showed very pronounced retardation of growth. At the age of six weeks, the smoking rats had attained only about half the size of rats the same age which had not inhaled tobacco smoke.

This experiment confirms in a most striking way the observation long since made of the retarding effects of cigarette smoking upon the development of boys, and clearly shows the importance of the enactment of laws prohibiting the use of tobacco by the young.

More definite details of the experiment are not given for the reason that the research is still in progress, under the supervision of the Committee of Fifty to Study the Tobacco Problem, which will publish a report in full when the research is completed.

Professor Cattell, editor of the *Science Monthly*, and one of the most eminent scientists in this country, has recently called attention to the startling fact that

the height of the average American has fallen off two and one-half inches since the Civil War. This is a most important observation and should lead to a diligent inquiry into the cause of this rapid physical deterioration. It is worth noting that within this same period of about sixty years cigarette-smoking has been introduced into this country and has grown until in 1920 the consumption reached the enormous total of 46 billions. Evidently the cigarette is stunting and dwarfing the American race. It is a race poison.

Tobacco No Protection Against Infection, But the Reverse.

That the use of tobacco may be the means of directly transmitting disease is well known. A cigar-maker in finishing a cigar sometimes puts the end in his mouth, and syphilis or tuberculosis may be communicated in this way. It has recently been proved that diphtheria and other infections may be transmitted by means of the "cigar cutter." On this account, the San Francisco Board of Supervisors recently passed an ordinance prohibiting the use of the cigar cutter.

A writer in *American Medicine* speaks as follows of the danger of infection from the cigar cutter:

"A person will often after he has first held his cigar in his mouth step to the counter and put his cigar into the cutter. This dangerous practice is so common

that it can be witnessed time after time at every cigar stand. Undoubtedly it has been one of the principal means of spreading infection among those who smoke cigars."

That smokers are more liable than others to infections of various sorts is known, and is probably the result of the lowering of vital resistance which the use of the drug always produces.

Throat and bronchial affections are most common among smokers. "Smoker's sore throat" is a recognized malady. The Phipps Institute reports show a larger percentage of deaths from lung tuberculosis among smokers and much smaller proportion of recoveries.

Dr. Lizars states that during an epidemic of cholera he observed that smokers were much more liable to the disease than non-smokers, and in much more malignant form.

Capt. Pettingill reports that he once lost half his crew of sailors of yellow fever in Havana and noted that all who died were tobacco users, and all who recovered were non-users.

Tobacco smoke has some slight antiseptic properties the same as the smoke of other substances, but its value as an antiseptic has been greatly exaggerated.

Many bacteria will grow in decoctions and infusions of tobacco, no matter what their degree of concentration.

The bactericide properties of tobacco smoke is not special to it. The smoke of any dry vegetable whatever, such as hay, for example, has exactly the same qualities. This fact is confirmed by the work of Trillat.

It is an error to suppose that the number of microbes in the cavity of the mouth diminishes under the action of tobacco smoke. There is also no foundation for the belief that the habit of cigarette smoking renders the body more resistant to infectious maladies.

In order to test this question, Gy inoculated with tuberculosis many guinea-pigs that had previously been inoculated with tobacco, and at the same time inoculated numerous controls that had had no tobacco. The controls survived longer in every case.

Leva (1907) injected several rabbits with one and a half to two milligrams (1-40 to 1-30 grain) of nicotine a day. He injected some of these rabbits with Eberth's bacillus (typhoid) and tested the serum for antibodies. Several controls were also injected with typhoid. The serum of the rabbit that had had no tobacco contained a much larger proportion of antibodies than did the serum of the tobacco-poisoned rabbits. This shows that tobacco prevents the formation of antibodies in the blood and so hinders the development of resistance to disease.

Gy conducted experiments with the diphtheria toxin, and found that guinea-pigs that had been poisoned with tobacco died much more rapidly than controls, the controls living many hours longer.

The explanation is simple. The liver of the tobacco-poisoned animal is crippled, and hence not able to protect the body against any new poison which may be introduced. This was clearly shown by the post-mortem examination of these rabbits. The livers of the tobacco-poisoned rabbits showed sclerosis, hemorrhages, and fatty degeneration. The livers of the controls showed no degeneracy.

It thus appears that science has clearly and fully demonstrated that smoking affords no protection against infection. On the contrary, the use of tobacco lowers vital resistance and thus opens the door to infection and lessens the chance of recovery.

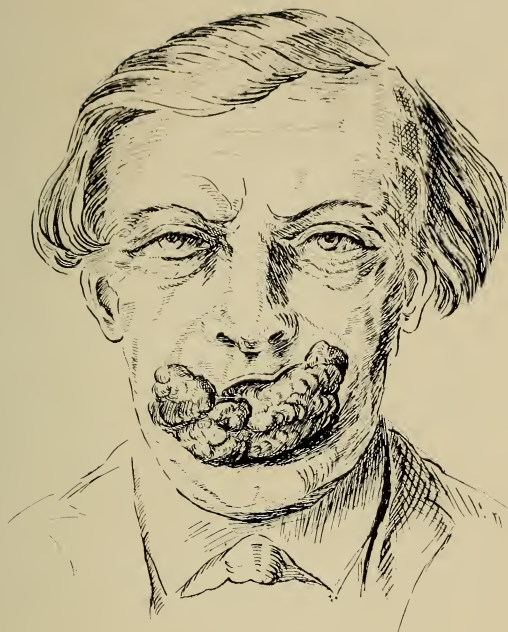
Tobacco a Cause of Acne.

"Weinbrenner," Journal A. M. A., relates that:

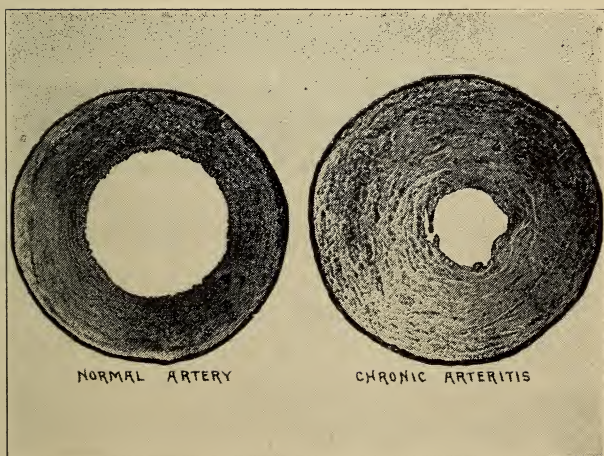
"In eight cases of rebellious necrotic acne, the affection disappeared when the men gave up tobacco. The acne subsided completely in a few weeks after the men gave up smoking. One of the men chewed tobacco, and this was the last one to recover, over two months elapsing before the acne disappeared in this case."

Tobacco a Cause of Diabetes.

By upsetting the fine adjustments of the body, tobacco favors especially the development of such disorders as exophthalmic goitre and diabetes. Dr. Heinrich Stern, an eminent New York physician, holds that the use of tobacco certainly aggravates an existing



TOBACCO CANCER

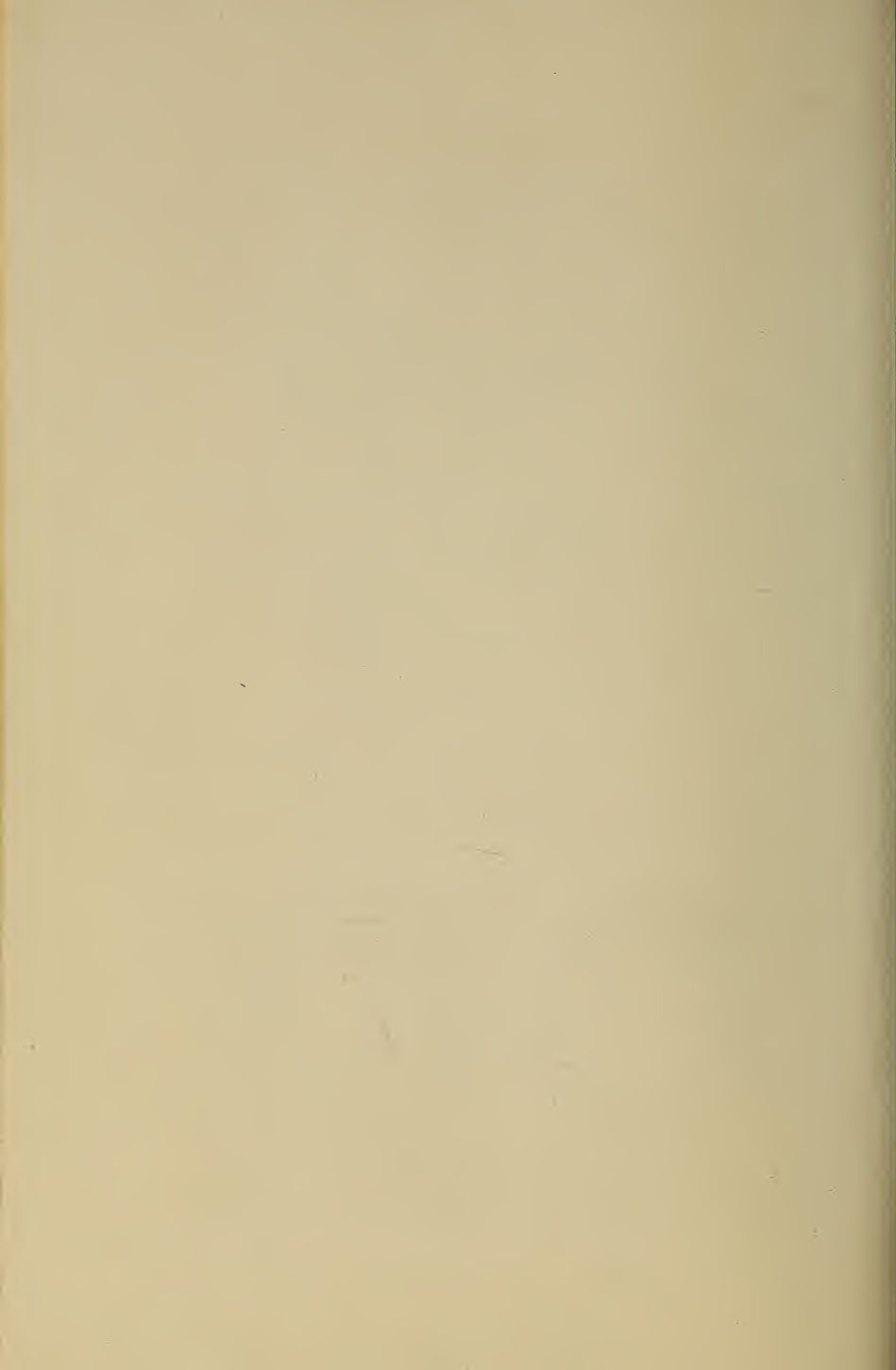


NORMAL ARTERY

CHRONIC ARTERITIS

HEALTHY ARTERY

ARTERY OF SMOKER



diabetes, increasing the sugar and the gravity of the disease.

Tobacco Cancer.

That the use of tobacco may cause cancer of the mouth has been long known. Dr. Abee of New York City recently (1916) reported one hundred cases of cancer of the mouth and throat, observed within fifteen months, of whom nine-tenths were inveterate tobacco users.

General Grant was an inveterate smoker and died of cancer of the throat.

The irritation from the pipe stem is regarded as a factor in causing cancer of the lip, as is also the heat of the smoke, especially when a short pipe is used.

Dr. Bloodgood, Professor of Surgery in Johns Hopkins University, in the study of 200 cases of cancer of the lip, finds smoking a common factor.

The Smoker's Legacy.

Brooks has made the interesting observation that symptoms of injury from the use of tobacco, especially as regards the circulatory system, "are more likely to appear in descendants of smokers than in those free from this family trait."

The writer observed a striking example of this some years ago, in the case of a veterinary surgeon who sought advice on account of shortness of breath. The cause was found to be a myocarditis probably due to smoking. "But," said the patient, much surprised, "I am only forty-five. My father and mother are

both nearly ninety years old and both have smoked all their lives." In ten years he was dead with cardiovascular disease. His son smoked and died of apoplexy at forty-five.

The enormous increase in the number of deaths from heart and kidney diseases in the last thirty years among men may be fairly attributed in part, at least, to the inherited weakness of heart and kidneys resulting from the use of tobacco, and a vulnerability to the effects of this poison. It is well known that a special sensitivity to certain foods, to the pollens of plants which produce hay fever, and to certain other poisons, is often recognizable as a family trait.

Dr. Henton White, an English physician (*Journal A. M. A.*, 1904, p. 325) reports a number of cases in which patients showed a congenital susceptibility to the injurious effects of tobacco which might fairly be attributed to inheritance of tobacco injuries from smoking ancestors.

Dr. Clifford Allbut, in his *System of Medicine*, writes: "One case is known to me, of a man whose health is excellent, who is by no means a neurotic subject, and whose heart stands work well in all other respects, in whom intermittance of the heart may occur for many days if he remains for an hour or two in a room with many smokers."

The late Dr. Norman Kerr held that tobacco "operates as a contributory factor in the development of that *neurotic diathesis* which in some constitutions

sets up the diseased condition of inebriety, either in the offspring or in the succeeding generation."

Said Prof. D. T. McDougal, before the American Association for the Advancement of Science, at its annual meeting in 1907:

"That the qualities and forms of living things are the final and net results of the action of environic conditions upon ancestral protoplasm, is almost universally agreed upon."

Commenting on the above, Dr. Lichty, a well known medical practitioner, remarks:

"This biologic fact is an added and forceful argument that the nicotine saturated and poisoned protoplasm tissue cannot genetically beget a standard healthy progeny. With this basic recognition, it is the doctor's duty to carefully consider the influence of tobacco-using upon the coming race; he should not remain either ignorant or silent upon the subject; if he does he is a derelict."

"Data are now present in sufficient abundance that the tobacco habitue's offspring are not endowed with the same potentiality, mental acumen and stability nor physical endurance that the non-user's children possess. In the New York reformatory at Elmira, among 5,000 subjects, whose average ages were under 18, 95 per cent. were users of tobacco."

"A Swiss observer states that even the nursing mothers of tobacco using parents cannot afford the

nourishment her offspring requires as adequately as one free from the taint of tobacco. Will this explain or afford one of the reasons for the dearth of nursing mothers in the third and fourth generations in free and fertile America?"

The evil hereditary effects of alcohol are known to be due to the effect of this poison upon the germ-plasm. Tobacco is a still more virulent poison than is alcohol, and it is generally employed in a manner which keeps the blood and the tissues in a state of saturation with tobacco-smoke poisons.

A striking illustration of the destructive effects of nicotine upon the progeny of tobacco-using parents, is afforded by the observations of Dr. Kostrál, physician to the royal tobacco factory of Iglan, near Vienna. Dr. Kostrál noted that the infants of women working in the factory were short lived. One-third of all the infants born died within the first year. One-fifth of all the children showed evidence of poisoning of the brain and nerves and died of convulsions. Dr. K. observed that the milk of these saturated mothers smelled of nicotine, so that these unfortunate infants unquestionably suffered from chronic nicotine poisoning.

Many men smoke at home and expose their families to the poisonous influence of tobacco smoke. The effects upon feeble infants and sensitive wives must be highly injurious and sometimes deadly.

Tobacco a Cause of Race Degeneracy.

Many different causes are operating to work the destruction of the human race. In great Britain, as in other old and densely populated civilized countries, stature is diminishing. According to Prof. Cartwright, B. A., B. Sc., the average height of a Briton one hundred years ago was 5 feet 10 inches. Today the height of the average man in Great Britain is only five feet, five inches.

It is well-known that tobacco disturbs appetite and digestion, that it stunts the growth of plants and animals. It seems just to attribute the marked physical deterioration of British manhood, in part at least, to the tobacco habit.

Said the late Dr. B. W. Richardson, one of the most sagacious and well informed of modern medical men:

"I do not hesitate to say that if a community of both sexes, whose progenitors were finely formed and powerful, were to be trained to the early practice of smoking, and if marriage were confined to the smokers, an apparently new and a physically inferior race of men and women would be bred up."

The *New York Medical Journal*, a highly respected medical authority, holds tobacco responsible for the rapid deterioration of the Maoris, one of the finest races of men which has been discovered in modern times. Says the *Journal*:

"When the Europeans first visited New Zealand they found the natives the most finely developed

and powerful men among the islands of the Pacific. Since the introduction of tobacco, for which these men developed a passionate liking, they have, from this source alone, become decimated in numbers, and so reduced in stature and physical well-being as to be an altogether inferior type of men."

Tobacco and Longevity.

One of the most unimpeachable evidences of race degeneracy is the decreasing number of persons who attain great age. Centenarians are becoming extinct. The proportion of centenarians to the general population differs greatly in various countries and agrees very well with the amount of tobacco consumed, but in inverse ratio.

Bulgaria numbers among her people 1 centenarian to the 1000; Spain, 1 to 40,000; France 1 to 190,000; England, 1 to 200,000; Germany, 1 to 700,00; in the United States, a younger population, 1 to 25,000.

It is an interesting fact that women, who rarely smoke, show twice as many centenarians as men. The oldest inhabitant is always a woman. As few women smoke, the last named fact has much significance.

The medical director of a great life insurance company, himself a smoker, stated to the writer that he and the statistician of the company, a man of international reputation, had independently arrived at the conclusion that tobacco is responsible for

about ten per cent. of the deaths which occur in smokers; or, as he put it, "for every 100 deaths of non-smokers, 110 deaths would occur in smokers of like age living under like conditions."

Women Smoke Less Than Men and Live Longer.

The mortality statistics show six male deaths to five female decedents. Sufficient cause for the greater life expectancy in women is to be found in their being less addicted to the use of alcohol and tobacco. It is claimed that ninety per cent of all men smoke, while comparatively few women do so. The use of alcoholic liquors by women is much less than by men. Hunter has shown that the mortality of moderate drinkers is double that of abstainers, and according to Dwight, the records of the New England Mutual Life Insurance Company covering sixty years show that the mortality of smokers is 57.6 per cent greater than that of non-smokers.

A comparison of the mortality of the two sexes is instructive. 140 males die from disease of the arteries to 100 females. At the age of 20-24 years 300 males die to 100 females. At the age period of 40-44 years, 376 males die to 100 females. For the 50 years between 20-70 years the proportion is 245 male decedents from disease of the arteries to 100 females. 170 males die of angina pectoris to 100 females.

The great excess of male over female deaths begins at the age period from 15-25 years, the age when the smoking habit usually becomes estab-

lished, and reaching its maximum at the age period of 40-44 years, the time of life when full maturity has been achieved and the old age process naturally begins. This is shown first in the hardening of the crystalline lens and the consequent loss in range of accommodation. In other words, the use of tobacco by 80-90 per cent of the male population hastens the development of senility in the blood-vessels, thus lessening life expectancy, since a man is as old as his arteries.

Use of Tobacco by Women.

Among civilized nations, tobacco has never been used by women to the same extent as by men, although at the present time the use of tobacco by women is increasing.

Snuff dipping was at one time nearly universal among the women of the "poor white" class, but this filthy practice has in recent years declined to a marked degree. At the same time, however, the use of the cigarette by women has increased to a marked degree in certain circles in our great cities.

The New York World asserts that probably 100,000 New York women are smokers of cigarettes.

There can be no doubt that the practice is no longer confined to street women and actresses and women of the "smart set," as a few years ago, but is rapidly extending to the more conservative classes. The suffragette movement seems to be in part responsible for this. The effect of securing civil and political equality with men seems to be to

develop in a certain type of feminine minds the desire to enter into all sorts of masculine activities and even to acquire the vices of men. Of course this is not a legitimate result of the battle of women for freedom, but rather an undesirable by-product. This tendency was illustrated recently by a London paper which showed a picture of ultra-fashionable young women smokers in loose trousers, the up-to-date style of smoking dress for women.

The war has no doubt greatly extended the habit of smoking among women. A smoking craze has been set going in the country through a sort of incendiarism adroitly engineered by the tobacco trust. The public mind has been inoculated with the idea that soldiers must of necessity smoke and many young ladies have acquired the habit through a semi-patriotic impulse of good fellowship.

During the war the tobacco trust captured the Women's Clubs and the Red Cross organization became the purveyor general for the tobacconist, putting a package of cigarettes into every soldier's "kit" along with other "necessaries" (?).

Of course no one can question that women have as good a right to smoke as have men. Further, it must be granted that if smoking is necessary for men it is equally as necessary for women. No sound argument can be offered in defense of masculine smoking which will not apply equally to women.

In the case of women, however, the question of motherhood comes into consideration.

In Nancy, France, according to Dr. Mutrel, the death rate among breastfed children was extraordinarily high because of the presence of nicotine in the milk of the mothers employed in the tobacco factories.

Dr. Kostrál, an Austrian physician, found nicotine both in the milk of nursing women employed in the tobacco factories and in the amniotic fluid—the fluid surrounding the infant before birth.

Sajous mentions among the symptoms of poisoning in an infant from exposure to a tobacco-laden atmosphere, loss of appetite, "smoker's eyes," listless ways, restless nights, nausea and vomiting.

When one recalls the deadly and dwarfing influence of nicotine upon young life in both plants and animals (see foregoing statements and cuts), it is not to be wondered at that the effects of tobacco-using by mothers should be so disastrous.

The tobacco-laden air of some houses must be a most unfavorable environment for a growing infant.

But in addition to contributing to infant mortality, there is ground for belief that the smoke habit among women must tend to lower the birth rate. The same disposition that would lead a woman to cultivate the tobacco habit would naturally lead her to avoid the perils, responsibilities and inconveniences of motherhood. The birth rate of "smart set" mothers is the very lowest of all classes. Perhaps this fact is a gain to society rather than a loss, so far as this particular class is concerned; but if all

mothers should become smokers, what would be the effect upon the future of the race?

Prof. Wilcox of Cornell University in a paper read before the Race Betterment Conference held at Battle Creek in 1914, showed by carefully compiled statistics that if the birthrate shall continue to decline at its present rate of decrease, no babies will be born in the year 2000. No doubt a close inquiry into the matter will show that the increase of the tobacco habit among women is a contributing factor to this phase of race degeneracy.

Lewin states (*Jour. Comp. Neurology*) that in female smokers menstrual disturbances are frequent and that abortion occurs often among female cigar makers.

Lewin also notes that sexual power and inclination are impaired by smoking and that impotence sometimes results. Lydston asserts that tobacco has a pronounced deleterious effect upon the genito-urinary tract.

The increase of the cigarette habit among young women, bodes ill for the future of the race. The report comes from Paris, where smoking has been indulged by women longer and to a greater extent than in other civilized countries, that strong evidence has appeared that the effect of cigarette smoking is to unsex young women by producing premature degeneration of the sex glands. One evidence of this is the development of the feminine mustache, which is becoming noticeably more frequent among young women smokers of Paris.

Dr. Cummings, the surgeon-general of the U. S. Army, calling attention to the enormous increase in cigarette smoking in 1919 (47 per cent) appeals to American women to combat this vicious practice, telling them that it "causes nervousness and insomnia and ruins the complexion," and is "one of the worst evils in American life."

Tobacco a Real Narcotic.

That tobacco is a narcotic drug, a "pain killer", as definite if not as potent as chloroform and ether, is shown by the fact that "before the time of chloroform and ether, tobacco was often administered to patients when great muscular relaxation was desired, as in cases of strangulated hernia and in fractures of the hip. This, plus a large dose of whiskey and morphine, rendered the patient fairly non-resistant to pain, during which time operations of even the most severe character were performed" (Isreal Bram, M. D.).

The author of "The New North" tells us of meeting a man at Fort Providence (Mackenzie) who had undergone an amputation of a leg without an anesthetic. David, one of the company's Old Guard, thus describes his operation:

"I was a young fellow, me, when a fish-stage fell on me. I didn't pay no notice to my leg until it began to go bad, den I take it to the English church to Bishop Bompas. He cut 'im off wid meat-saw. No, I tak' not'in, me. I chew tobacco and take one

big drink of Pain-Killer. Yas, it hurt wen he strike se marrow."

"Heavens! Didn't you faint with the awful pain?"

"What? Faint, me? No. I say, 'Get me my fire-bag, I want to have a smok'."

A drug which may in emergency take the place of chloroform is certainly not suited to general and habitual use as a "comforter," and cannot fail to work havoc with the vital machinery if so used, as would chloroform, opium, or any other narcotic or anesthetic drug.

TOBACCO-USING A DRUG HABIT

That tobacco is a form of "dope" as really as is opium, cocaine, or any other drug, cannot be denied. The confirmed cigarette smoker is as thoroughly enslaved as is the opium smoker or the alcohol inebriate. He is a "dope" fiend, to use a common, but rather repulsive phrase, an addict, and often requires the same restrictive measures to secure reclamation as does the confirmed alcoholic or opium habitué.

Tobacco-using Leads to Alcoholic Intemperance.

Naturally, one drug habit leads to another. It is rare to find an alcoholic who does not use tobacco in some form and often other drugs are used.

There is a special reason for the association of the alcohol and tobacco habits; a physiologic reason:

Alcohol is a drug antidote for tobacco.

Tobacco contracts the small arteries. This is the reason for the pallor observed in young smokers and

in old smokers who have smoked to excess. Alcohol produces the opposite effect. It dilates the small arteries. This is the reason for the flushed face of the beer drinker and the red nose of the whiskey toper.

A man who has smoked until his arteries are contracted, feels tense, nervous, irritable, restless, in spite of the narcotic effects of the drug. His blood-pressure is high and his breath a little "short." Besides, his secretions are checked, his mouth is dry. Alcohol reverses these conditions. A cocktail or a toddy, a glass of champagne or a bottle of beer, relaxes the blood-vessels, relieves the nerve tension, restores comfort and so opens the way for more cigars.

Narcotic drugs produce different, but kindred effects. The exchange of one drug for another is going about in a circle rather than making progress.

China has abandoned opium, but has surrendered completely to the cigarette. Possibly the last condition may prove to be worse than the first because more universal.

Very few boys learn to drink without first learning to smoke. The same disposition which leads a man to see comfort in a cigar or a cigarette, leads him to look for the same or kindred pleasure in a glass of beer or a "high ball."

There is a similar association between tobacco and the opium habit. Most opium addicts are also cigarette smokers.

Most cigarette smokers are also coffee toppers, often taking daily several cups of strong, black coffee, or coco-cola, holding in solution many grains of caffeine. This, again, is a sort of antidotal association, although caffeine, like nicotine, raises blood pressure.

When smoking is practiced to great excess, the pressure raising effect is reversed; pressure at first is raised and later lowered, and the need of a pressure raising drug is felt, hence coffee becomes associated with the cigarette because it makes greater indulgence possible. Caffeine, being one of the most powerful of all known pressure raising drugs, will still act upon the heart and blood-vessels when the depressing effects of tobacco have been developed by great excess.

Shoemaker, an authority on drugs, tells us that: "In the east the tobacco is sometimes tinctured with opium, in order to increase the narcotic effect."

Dr. John D. Quackenbos, of Columbia University, in an address before the "Society for the Study of Alcohol and Narcotic Drugs," declared that tobacco creates an instinctive demand for alcohol, and that what he termed "the intemperate use of tobacco," "explains 75 per cent of all drink cases," adding that "the alcohol thirst is engendered and inflamed by smoke."

Dr. Hamilton, superintendent of an "Institute" for the treatment of alcoholics, states that his experience is: "That persons applying for treatment for both liquor and cigarettes, dread giving up their

cigarettes more than they do the liquor. Moreover, those who return to the use of cigarettes in after-life are almost certain to resume the use of liquor to allay the irritability of the nervous system produced by tobacco smoke inhalation."

THE MORAL EFFECTS OF TOBACCO USING

The only substantial apology offered for the use of tobacco is its psychic effect. Nobody claims that tobacco makes a man stronger or more enduring, clearer headed, keener of sight or hearing, more alert or in any way more efficient. Its effects are exactly the opposite as everybody knows. Tobacco is a narcotic. Its effects are those of a soother. It is in no sense a stimulant or an excitant. If a man feels more "fit" after a cigarette or a cigar, it is only because he has become a drug addict and was suffering for the want of his accustomed "dope," not because he is in any way stimulated or strengthened.

Tobacco is a camouflage. It renders a man oblivious for the moment to fatigue, business cares, domestic and social infelicities, and other causes of psychic distress, but nobody has even suggested that tobacco *cures* any of these miseries. The man who is hungry smokes and no longer craves food, but *he has not been fed*. The hunger is there as before, but is hidden. The man who relieves fatigue by smoking has not been rested. The wasted nerves and muscles are weary as ever.

Tobacco cannot take the place of food or rest. It does not solve business problems nor smooth out social or domestic difficulties. It is nothing but a psychic camouflage.

Every smoker knows this. The resort to the cigar for comfort is, then, a confession of weakness, a willingness, even a desire, to be deceived, to be transported into a sham heaven. Even worse; it is a confession of cowardice, of unwillingness to face and surmount the obstacles to physical, mental or moral peace and comfort.

The cigar is a foe to high ethical ideals. How many smokers find in the cigar a hiding place from the upbraiding of an uneasy conscience for small or large departures from strict rectitude, cannot be even conjectured. Certain it is that the cigar is an efficient "silencer." Said Tolstoi of his smoking days, "I never felt a twinge of conscience after the third whiff."

That the use of tobacco impairs the fine sense of propriety and of regard for the rights and feelings of others, which refined breeding and the mores of genteel society demand, cannot be denied.

The obtrusive manner in which smokers display their cigars and pipes in public and private places, filling the air of cabs, waiting rooms, theatres, offices, and all places where people congregate, with the possible exception of churches and museums, with clouds of poisonous fumes and stale tobacco stench which are often the occasion

of great distress as well as inconvenience to non-smokers, is substantial proof of the wholesale moral injury resulting from the use of the weed.

Mark Twain presented himself as a perfect illustration of this sort of moral damage. On one occasion, the humorist visited Oxford for the purpose of being honored with a degree which the great university had invited him to receive in recognition of his literary work. Smoking is strictly prohibited in Oxford, and Twain admits that he knew this, but confesses that he openly violated the rule notwithstanding the fact that as a guest and the recipient of a distinguished favor, he was bound by every principle of honor and decent courtesy to conform to the customs of the place. Twain not only confessed his rudeness, but treated it as a joke, showing that his fine sense of propriety in conduct in relation to tobacco had become so benumbed and paralyzed by the smoke habit that he even gloried in his disgraceful conduct.

Poor Twain at last became completely saturated with nicotine and literally smoked himself to death.

Every habitual smoker carries about with him in his breath and his clothing, even when his pockets are not filled with tobacco or a lighted cigar burning in his mouth or his hand, the strong offensive odor of a stale cigar, which is sickening to non-users, and even to many users, and appears to be wholly unconscious of the fact that his "bouquet" is to a non-smoker a veritable breath from the Stygian pool of ancient fable.

Nothing but a considerable degree of moral decadence could make a well-bred man so oblivious to the rights and feelings of others as is the average smoker?

Under the influence of tobacco, the judgment, the will, the conscience, the imagination, every mental and moral faculty, are changed—all are nicotinized. The smoker is transported to a nicotinized heaven where all things are viewed through a cloud of tobacco smoke. In other words, the “pipe dream” is a sort of temporary drug insanity,” as really an intoxication as an alcoholic “drunk.”

Dr. Tracy (*Medical Review of Reviews*, December, 1917), draws the following very accurate picture of the psychology of a pipe “jag”:

“Tobacco intoxication is an egotistic narcosis. Tobacco makes the user feel like parading the narcosis and the manner and act of taking the narcotic. Tobacco narcotism is a grandeur narcosis. It is intrusive and obtrusive. It is good-naturedly aggressive. It is so care-freeing to its user that it creates the impression that those with whom the user comes in contact are also free from care. It creates the impression that that which is so pleasant to the user is without question pleasant to every one else. In the narcosis there is not the least thought of possible impropriety in its use, or in anything connected with its use. And in still less degree is there anything like self-censure. So far, in fact, does this grandeur impression

carry, that to the user of tobacco any opposition to its use at once suggests that there is mental abnormality in those who would interfere with the practice."

"What I shall say about the demoralizing and destructive effects of the cigarette habit is not the raving of a fanatic or the rabid utterance of a crank," said Leonard G. Broughton, M. D., in an address to men, at Beaumont, Canada. "I speak from a personal knowledge of scientific truth. The smoke is inhaled into the lungs, the poisonous gases are communicated through the blood to the brain and to the nerve centers that control the moral sensibilities, stupefying and destroying. Soon the fine edge of moral distinction is blunted, the difference between right and wrong is blurred."

A fair inference as to the moral influence of tobacco may be drawn from the following statement made by a New York City magistrate:

"Ninety-nine out of a hundred boys between the ages of 10 and 17 years who come before me charged with crime have their fingers disfigured by yellow cigarette stains."

A rather caustic writer in the "Contributors Club" of *The Atlantic Monthly*, thus describes the psychologic effect of the cigar:

"The cigar I always regard as the most patent symbol of blatant maleness. It can apparently be held in the teeth only at a certain angle, and this angle always gives a peculiarly rakish expression

to the most benevolent face. The cigar tends to bring out unconsciously in a man's expression all those saloon-keeper and tough-politician traits which are latent, I suppose, in every man."

THE ENORMOUS ECONOMIC WASTE FROM TOBACCO

Although the economic losses from the use of tobacco are of little consequence when compared to the injury to health, life and morals, they are well worth considering.

The amount of money annually expended for tobacco in this country alone amounted, according to Professor H. W. Farnum of Yale University, in 1917, to \$1,200,000,000.00. This was more than all the metals mined (gold, silver, iron, copper, etc.), in 1915, an average year, one-half more than the coal mined, three times the amount expended for highways, more than the total expenditure for education. And what did tobacco give us in return for this vast sum, sufficient to pay the interest on our war debt? Nothing at all but disease, death and race degeneracy.

Tobacco exhausts the soil. It takes out of the soil more of the precious potash and other elements needed for the production of food than does any other crop. Tobacco takes from the soil five times as much as does wheat, corn or potatoes. The two million acres devoted annually to tobacco culture if planted to wheat or corn would produce

not less than 3,000,000,000 pounds of grain, which would feed six or seven million people for the entire year. There are many thousands of acres in the South and in New England which have been worn out by tobacco crops and practically spoiled for agricultural purposes.

One of the greatest economic losses from tobacco is in the fires produced by pipes, cigars and cigarettes or the matches used in lighting them. According to Professor Farnam, the loss from careless disposal of burning cigars or cigarettes amounts to nearly \$100,000,000.00 a year. Fire Commissioner Johnson holds the causes named are responsible for one-fifth of all the fires which occur in this country.

The fire which destroyed the great Equitable building was caused by a match used (doubtless) to light a cigarette. The terrible explosions which wrecked a part of Jersey City were caused by a fire started by a cigarette, as was also the Triangle Shirt Waist factory fire, which destroyed the lives of one hundred and forty girls.

The aggregate direct and indirect economic losses due to tobacco, cannot be less than a billion and a half dollars annually. In these days of economic stress, why should such a useless waste be tolerated?

APOLOGIES FOR THE TOBACCO HABIT

The growing recognition by many thoughtful persons in recent years of the evil effects of to-

bacco, and the resulting efforts against this evil practice, has naturally led the partisans of the weed to come forward with arguments in its favor.

Does a Man Need Soothing?

One of the most frequently urged apologies for tobacco is its soothing effect.

It is fair to raise the question, does a man in ordinary health and under ordinary conditions require, like an irritable infant in arms, "a soother," or, is there any real profit in such a thing?

This question is really a vital one, since if it is not needed as a soother, no apology whatever can be found for tobacco, for no one seriously claims that the drug improves the health, strengthens the heart, reinforces endurances, protects against disease, or does any other positively good or necessary thing.

In seeking an answer, it is to be noted first of all that no one ever begins the use of tobacco for the purpose of securing the benefit of its soothing properties. Indeed, the first effects obtained from it are very far from soothing in character. The boy who has just smoked his first cigarette presents a graphic picture of discomfort, even misery. It is only after the body has become inured to its poisonous effects that any soothing effects are to be noted. And old smokers are ready to confess that the exhilarating or pleasurable effects experienced at first ultimately disappear and are no

longer felt. The truth is that the soothing effects of tobacco amount to little or nothing more than relief from the discomfort produced by the absence of the drug when the tobacco "habit" has been established. That is, tobacco simply mitigates the miseries which tobacco produces.

No tobacco user under any circumstances is any better off with tobacco than is the non-user without it; and certainly when tobacco is not to be had, the non-user has the enormous advantage over the user that he does not suffer the horrible craving for the drug which is often about the worst misery which a human being can be called upon to endure.

It is fair also to ask, Why should a strong man want to be soothed? Why should he desire to be made oblivious to any condition which he must meet, any obstacle which he must overcome or any problem which must be solved?

The normal rest for the mind, all that any sound man requires, is afforded by sleep; when a man is awake, he ought to be in full possession of all his senses, alert to every emergency, ready to meet any difficulty or to attack any enemy which may oppose his progress or threaten his interests.

"Soothers" and "all-day suckers" are for whining infants and are not good even for them. No real man needs a smoke screen to hide from his consciousness the problems and eventualities which he should or must face.

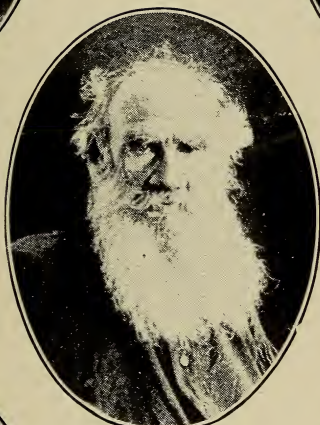
A New York surgeon, himself a smoker, has brought forward the idea that normal men smoke



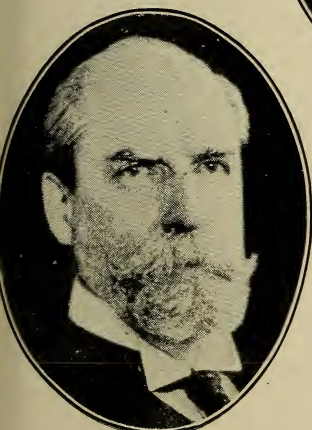
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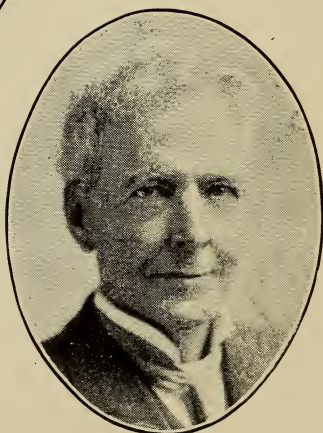
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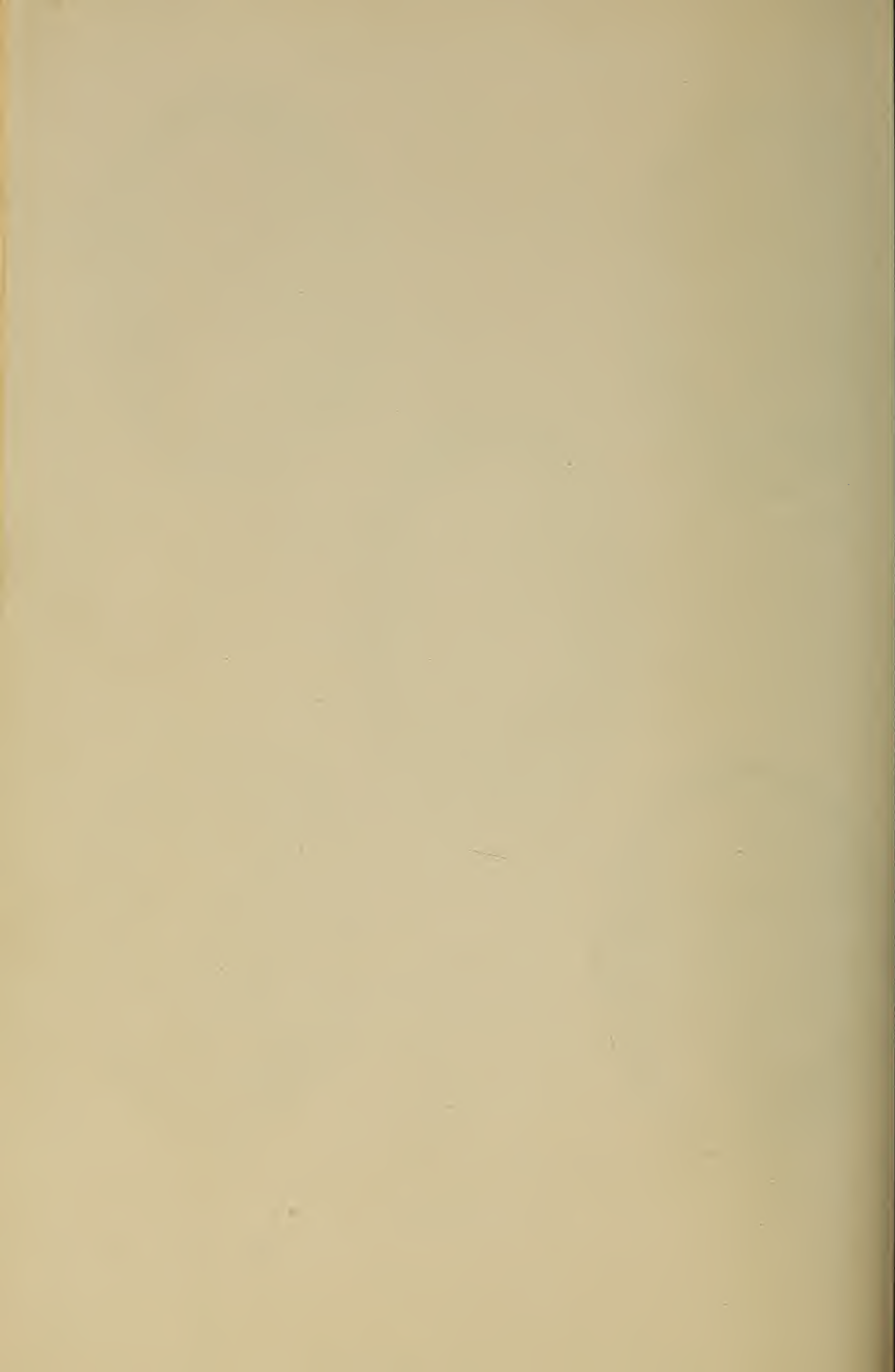


CHAS. E. HUGHES, SEC. OF STATE



LUTHER BURBANK

Non-Smokers



to relieve the friction of living, and to create a sort of "second personality," an easy-going character which forgets "conventions" and surrenders to primitive sense enjoyment, as a means of relaxation from the strain and tension of civilized life, with its restrictions and repressions.

Another physician, an alienist of some note, thinks tobacco is needed to create artificially the state of relaxation normally produced by rest.

Neither of these writers considers the fundamental question, "Are these artificial conditions created by alcohol [or tobacco] safe substitutes for physiologic rest, and is it a wholesome thing for men to be systematically and habitually released from the restrictive conventions of life which form a part of the mores, of the culture of our day?" (Prof. Irving Fisher.)

In other words, this effect of nicotine is really nothing other than a benumbing of the higher and critical functions of the mind, designed as aids to moral guidance and normal living. Certainly, no evidence has been offered to show that smokers are in any way superior mentally or morally to non-smokers; the weight of evidence is, in fact, all to the opposite.

Since smoking does not really rest the tired man, but only hides his sense of fatigue, it is evident that it is no substitute for normal rest, and may do much harm by hiding from the smoker a knowledge of his real condition.

If one needs relief from nervousness, there are far better means of lessening the tension than by tobacco. Rest, if necessary, and a warm, neutral bath will afford a wholesome relief such as no drug will give and will succeed even in cases where the most powerful drugs fail. This fact is demonstrated every day in the leading neuropathic institutes and state hospitals of the country.

When a soothing drug is necessary, it should be administered by a physician and not by a street vendor or a bartender. Certainly, no well-informed physician would select one of the most treacherous and destructive of all the drugs known to man as the agent to be employed as a nerve quieter. Even opium does not produce the destructive changes in the body which have been shown experimentally and clinically to be produced by tobacco.

How to Stop Smoking

The way to stop smoking is TO STOP. For some persons to cease to smoke is easy; for others, it is difficult.

The various classes of persons who use tobacco may be classified as follows:

1. Those who smoke simply as a matter of sociability.
2. Those who smoke from force of habit, just as others indulge in the habit of chewing gum.
3. Those who smoke for the pleasure experienced.
4. Those who smoke to relieve the discomfort and misery which is experienced in the absence of an accustomed indulgence.

Little consideration need be given to the first three classes of smokers. A smoker of the first class, as soon as he becomes convinced of the evil effects of tobacco and of his duty as a man not only to abstain from doing damage to himself, but from setting an example which may lead others to injure themselves through the formation of the pernicious habit, will abandon the practice. There is no obstacle in the way, because the practice may be stopped without inconvenience. No "craving" or other inconvenience is experienced because the habit has not yet reached the stage of drug fascination.

Smokers of the second class may drop the habit with almost equal ease. For a short time there is felt a loss of the habitual excitation of the fifth nerve, a stimulation akin to that which is produced by scratching the head or biting the lip, or in some other way producing a slight irritation of the nerve of sensation of the face through which impressions are transmitted to the brain. Chewing gum or chewing a stick is often temporarily substituted for the cigar and with equally good effect.

The third class of smokers appreciate the loss of the soothing effect they have been accustomed to find in the after-dinner pipe or cigar or the cigarette smoked after meals or at the close of the day's work. For such it is only necessary to form a good stiff resolution to forego the illicit and damaging temporary enjoyment which can only be experienced at the cost of later injury and suffering for which the pleasure experienced can afford no adequate compensation.

It is with the fourth class of smokers that the real tug of war occurs. The confirmed smoker who has reached that point at which the cigar, pipe, or cigarette is necessary to prevent nervousness, irritability, mental confusion and incapacity for work or pleasure and to enable him to center his mind upon work or study, and to maintain the mental poise essential for effectual activity, will undergo a real test of character in any attempt to escape from the toils of the tobacco habit.

Persons of this class are compelled to make a determined struggle. When the cigar is thrown away, they suffer in essentially the same way as the victims of any other drug habit. Persons of this class have usually been great smokers, often incessant smokers. They are usually of a highly nervous temperament, and, generally, to a pronounced degree, neurasthenic.

The neurasthenia may be largely or only in small part due to tobacco. Not infrequently, in fact, the tobacco habit has been formed very largely through the effort to find in the cigar relief from the distressing neurasthenic symptoms, which are the natural result of sedentary habits, constipation, with its resulting autointoxication, loss of sleep, worry and other causes which waste and exhaust the nervous energies.

Persons of this class often make for themselves the discovery that tobacco is an injury. They find that relief is only obtainable by a continually increased consumption of tobacco. Either more cigars or stronger cigars are required to produce the effects which were formerly produced by a single mild cigar or even a cigarette.

Such persons often try again and again to emancipate themselves from the smoke habit, but on renouncing the cigar have found themselves so utterly incapable of sustained effort that the attempt is speedily abandoned, and often with full knowledge of the damage to heart, lungs or other

organs that was being done by smoking, and an appreciation of the fact that life was being shortened by continuing the habit.

Such a person, to be successful in escaping from the toils of the tobacco habit, must organize and perseveringly maintain a systematic and unrelenting campaign. He must say, with the heroic Patrick Henry, "Give me liberty, or give me death."

Here are a few practical suggestions which if faithfully followed may be relied upon to secure the freedom of any victim of the drug who has sufficient character and resolution to make a persevering effort.

It should be said that these suggestions are not presented on theoretical grounds. They have been successfully employed in dealing with the cases of thousands of tobacco-users who have visited the Battle Creek Sanitarium, an institution in which the use of tobacco in any form is not tolerated. It is a matter of common observation that the diet of the institution somehow destroys the appetite for tobacco. Many smokers find themselves quite unable to smoke at all after having taken a few meals in the Sanitarium dining-room, and nearly all notice that the desire for tobacco is lessened to such a degree that it is little or no trouble to drop the habit altogether.

Any reader who may be a victim and desires to free himself from this pernicious enemy of life and health, and who finds himself unable to ac-

comply with his desire by the aid above offered, is cordially invited to write the author, who will gladly offer, without charge, any suggestion or advice which may seem suited to the case.

Suggestion 1.

The decision to renounce tobacco in any form must be fully and definitely made. The subject must be thoroughly convinced that tobacco is an evil thing, possessed of a most pernicious potency—an enemy which must be fought with energy and determination, and with no thought of compromise.

First of all, let the smoker be assured that tobacco is not in any way sustaining or supporting him, that it supplies no bodily need, that it has not by "second nature" or in any other way become essential to life.

No matter how distressing may be the sensations of the habitual smoker when deprived of his tobacco, he may be assured that his misery and distress do not indicate any danger to life, but are simply due to the awakening to normal activity of nerves and sensibilities which have long been obscured by the influence of the narcotic drug. The distress may be hard to bear, but nobody ever died as the result of it. In fact a person when comfortable under the influence of a cigar is much nearer to the danger line than when suffering and distressed in the absence of the cigar. It is to be remembered that the cigar is nothing but

a camouflage. It hides pain and distress, but it does not remove the cause of it, but rather is itself a cause—a wolf in sheep's clothing—an enemy wearing the garb of a friend.

Having determined to stop smoking definitely and permanently, a man who has thoroughly informed himself respecting the harm tobacco does, should fortify his mind with a compelling array of all the mischiefs done by this mighty destroyer of man and manhood. He should have clearly and constantly before his mind's eye a vision of the evils wrought by the smoke demon upon brain, heart, blood, blood-vessels, liver, kidneys and every bodily structure. He should keep ever before him a vision of the high blood-pressure, Bright's disease, angina pectoris, apoplexy, insomnia, premature senility and emasculated manhood which are the certain consequences of continuing the smoking habit. He must become thoroughly convinced that for him it is nothing short of slow suicide. He must see in the cigar, the pipe, the cigarette, an enemy that is attacking him,—the "Old Man of the Sea" that is dragging him down to death. This attitude of mind must be resolutely cultivated by a continual reiteration of the mischievous effects which tobacco is known to produce and particularly of the personal injuries which have been suffered.

By training the mind to think in this channel, never once yielding to the temptation "to take a

few whiffs, not enough to do any harm," and always holding tobacco before the mind as an implacable enemy, a hideous fiend, a devouring fire which must be extinguished, a mental barrier may be created which will serve as a wall of defense, and, in the majority of cases, the desire for the drug will quickly disappear. But there must be no temporizing, no dilly-dallying, no compromise.

Never for a moment should the thought of tobacco as a solace, a friend, and comforter be entertained. By maintaining this sturdy, belligerent attitude toward the habit, a psychologic antidote for the tobacco "craving" will be developed, and often this may be accomplished in a surprisingly short time.

Mark Twain, who once discarded tobacco in obedience to his physician's orders, affirmed that the only proper cure for the tobacco habit was to cease to want to smoke, which, although an inveterate smoker, he found to be easy to do when the right mental attitude was assumed.

Suggestion 2.

It is a great help to change the environment and the occupation for a short time, so as to escape so far as possible, from the conditions and influences which automatically suggest the habit; that is, to escape from association with smokers and "makings," pipes, spittoons, ash trays and even matches,

every association which smells of smoke or smokers. An outing, an automobile trip, any sort of out-of-door excursion, will serve to divert the mind and to refresh and energize the body, and silence the clamoring of the nerves for the accustomed indulgence.

Suggestion 3.

Stimulants of all sorts must be discarded along with the tobacco. Alcohol and tobacco are twin evils each of which assists the other in enslaving and destroying the body. Alcohol dilates the blood-vessels and tobacco contracts them; hence, one drug is in a certain sense an antidote for the other, and creates a demand for it. The man who smokes feels tense and drinks a cocktail to relieve the tension. The toper follows his beer or grog with a pipe or a cigar for the very opposite reason.

Suggestion 4.

It is likewise important to discard stimulating foods, such as mustard, pepper, peppersauce, ginger and hot spices and sauces of all kinds. These all have the effect to create a nerve tension which causes a craving for alcohol as an antidote. Even flesh foods should be discarded for a similar reason, because of the tension created by the uric acid in meat. Tea and coffee should be discarded because of the very marked and injurious influence of caffeine, which is a nerve poison and a habit.

Suggestion 5.

Clinical experience has shown that there is a certain remarkable antagonism between certain foodstuffs and tobacco. This is particularly true of carbohydrates, that is, starch and sugar, especially as found in cereals, potatoes and fresh fruits. Milk, when frequently taken, seems to have a similar effect. Patients who are taking the milk regimen quickly lose their desire for tobacco. The same is true of the fruit regimen. (For full information concerning these regimens, see *Autointoxication*, Modern Medicine Co., Battle Creek, Mich.)

On the other hand, a diet rich in meats, with condiments of any sort, and the usual accompaniments, tea and coffee, tend strongly to promote the craving for tobacco and hence are obstacles in the way of escaping from the toils of the habit.

While the shortest and best way out is to take up arms against all these enemies and discard them at once and forever, it is not every victim of these enslaving drugs that has the resolution or the disposition to do so. Such may adopt a more gradual process of elimination, but should do so with the full knowledge that in the aggregate the inconvenience will be considerably increased by the length of the process instead of diminished. As a matter of fact, if all the associated poisons are eliminated at once, the battle, though perhaps more intense, is usually in a short time complete-

ly won; and if there is no dallying with the tempter, but strict adherence to a non-stimulating regimen, the agents of illicit pleasure and physical destruction, will be easily and soon forgotten.

If what might be termed "the graduated method" is to be adopted, proceed as follows:

The *first week* discard tobacco. If coffee has been regularly used, take one cup only at each meal and no more. Don't increase the coffee to make up for the non-use of tobacco. This would only be substituting one drug habit for another.

The *second week* discard coffee, "change the flora, and adopt the antitoxic diet. (See the *Simple Life in a Nutshell*" and "*Autointoxication*," Modern Medicine Publishing Co.)

Suggestion 6.

Most great smokers are neurasthenic. They smoke to relieve various neurasthenic mental or nervous symptoms. The neurasthenia, which has long been a constant provocative cause for the resort to cigar or cigarette must be cured. In a majority of cases, the cause is chronic constipation and resulting auto-intoxication. The cure for neurasthenia is to be found not in the use of drugs of any sort—all of them are useless, even worse than useless—but in living biologically. This means living upon a natural diet, a diet in which meats of all kinds are excluded, along with irritating condiments, mustard, pepper, peppersauce, etc.—the "antitoxic diet."

The biologic life also requires an abundance of outdoor exercise, open-air sleeping, that is, sleeping with wide-open windows or on a sleeping porch, and wholesome relations to life in all particulars.

Suggestion 7.

The activity of the bowels must be increased so as to keep the colon free from putrefying residues, one of the most active provocative causes of smoking, as well as other drug habits. The products of putrefaction are absorbed into the blood and, circulating through the body, give rise to morbid mental and nervous symptoms and conditions which clamor for relief, which is temporarily given by both alcohol and tobacco. Constipation and autointoxication are thus active causes of intemperance and of the tobacco habit. The neurasthenic smokes because in so doing he finds temporary relief from the miseries which accompany his malady. Removal of this cause of discomfort is one of the first and most necessary steps to be taken toward the cure of the tobacco habit. The cure is to be found in a "change of the intestinal flora," thus suppressing putrefaction in the colon by the adoption of an antitoxic diet and the employment of such tonic and other physical and psychologic measures as may be necessary to overcome the patient's neurasthenic condition.

Suggestion 8.

The extreme nervousness, often accompanied by sleeplessness, which results from the disuse of tobacco

in certain cases, may be very certainly relieved by a very thorough-going use of the neutral bath. This is a full bath taken at 92 to 96 degrees F., just warm enough to be comfortable. It should be continued fifteen to thirty minutes, or even longer if necessary to produce a disposition to sleep. The duration of the bath may be extended to an hour or two or even more in extreme cases. It is always successful when perseveringly employed. In getting out of the bath, care must be taken to avoid getting chilled, even to the slightest degree, as this will quite destroy the beneficial effect of the bath.

The effects of this bath are really wonderful. Within the last twenty years it has almost entirely superceded the use of hypnotics and narcotics in State insane hospitals in the management of disturbed cases, and has rendered unnecessary the use of the straight jacket and other means of physical restraint.

A person seeking relief from the tobacco habit should take a neutral bath regularly every night at bedtime, and should remain in the bath until decidedly drowsy, going then directly to bed, taking care to avoid the slightest chill, the effect of which would be to destroy the favorable influence of the bath.

The electric light bath or some other form of sweating bath is highly valuable as a means of hastening the elimination of the nicotine. Normal conditions cannot be established until every particle of nicotine is removed from the blood and tissues. This often requires several days for the reason that in persons who

have long indulged quite freely in the use of tobacco, the liver and kidneys have become so damaged that the nicotine is not eliminated promptly, as at first, and so accumulates, saturating the tissues. In such a person, the odor of tobacco "hangs on the breath" for hours after a cigar has been smoked. The sooner the nicotine can be gotten out of the system, the sooner the discomforts, physical and mental, arising from the attempt to break the habit will disappear.

When there is a feeling of weakness in the abdomen, an abdominal supporter should be worn. A tight bandage may render some service.

Suggestion 9.

The cold morning bath is an excellent means of combating the condition of exhaustion or lowered "tone," of which the patient becomes conscious on discarding tobacco. Cold water is one of the most powerful of all known tonics. When applied to the general surface of the body, it sends into the brain and spinal cord, stomach, liver and every vital organ, a fusillade of nerve impulses, which acts as a vital stimulus. If the patient is obliged to dress in a cold room, an air bath will suffice. On removing the sleeping garments, the bare skin should be exposed to the cold air while being vigorously rubbed with a coarse towel. He should exercise at the same time vigorously so as to promote the blood circulation and warming of the skin. After a minute or two, if the temperature of

the air is quite low, the patient should return to the warm bed until a good reaction has developed and a warm glow felt over the whole surface of the body, and then dress.

In general, a cold towel rub, or a cold shower bath, or a dip in a tub of cold water is to be preferred. The cold water bath should be taken in a warm bathroom. It should be followed by a vigorous rubbing and thorough drying of the skin. It is well, also, to apply to the whole surface a little lanolin cream, of which the following is the formula:

Lanolin	2 drams
Boro-glyceride	1 dram
Cold cream made with white vaseline	6 drams

Suggestion 10.

Patients who suffer much from great depression will be greatly helped by hot and cold applications to the spine. Such an application consists of a hot fomentation applied to the whole length of the spine for four or five minutes, followed by rubbing with a piece of ice which is rapidly moved up and down the spine. The fomentation is usually applied three times, each time being followed by the ice rubbing.

The moist abdominal bandage worn at night is a capital means of relieving the congestion and sympathetic nerve irritation which generally exist in the abdominal region. Tobacco has a particularly pernicious effect upon the sympathetic nervous system, and this injury expresses itself especially through the

great sympathetic centers located at the epigastrium and in the region of the umbilicus.

It is well to apply a fomentation over the abdomen for ten or fifteen minutes at a time, followed by a moist abdominal bandage to be worn during the night or even constantly for a week or two. This application consists essentially of a towel wrung out of cold water as dry as possible, wrapped around the body and covered with dry flannel. The covering should be thoroughly done, so that no portion of the moist bandage is exposed. The flannel wrapping should be thick enough to secure a quick warming of the towel, and to keep it warm. Both bandages should be applied snugly.

Suggestion 11.

Free water drinking is of very great value in cases of this sort. Three quarts of water should be taken every twenty-four hours. A good plan is to take a little water every half hour. The water may be taken either hot or cold. If ice water is taken, it should be sipped very slowly. Diluted fruit juices may be used instead of plain water and with benefit.

Suggestion 12.

There is no drug antidote for tobacco which is not as bad as the tobacco itself, but rinsing the mouth with a solution of nitrate of silver, two or three grains to the ounce, temporarily destroys the taste for tobacco, and so lessens, if it does not entirely destroy, the

craving for the drug. When the craving occurs, rinse the mouth with a spoonful of the solution and seek some diversion for mind and body. A capsule containing one one-hundredth of a grain of nitrate of silver, with a small quantity of sugar, has been used with some apparent benefit. This is chewed up and dissolved in the mouth.

The chewing of gum or of licorice or sarsaparilla root has also rendered some service; but such remedies should of course be relied upon only to a very limited extent and that during a brief period. The real remedy is to be found in setting the mind, the conscience and the will, resolutely against the drug and fighting it with manly courage and determination.

Suggestion 13.

Whenever possible, the patient should spend two or three weeks at a sanitarium while learning to get along without the drug, so that he may have an opportunity at the same time to form habits of biologic living which may relieve him of many habits and disorders that are leading strings to the drug habit as well as other enslaving influences.

Stumbling Blocks.

Many smokers excuse themselves for the indulgence of the habit on the ground that smoking is necessary to relieve some physical ailment or inconvenience, often quoting the advice of some physician who has recommended tobacco as a remedy.

It must be admitted that in most case the apology is a lame one, and is, in fact, nothing more nor less than a camouflage for the desire to smoke. Few smokers are willing to confess that they are the victims of a drug habit; some smokers are not. Those who are really enthralled are naturally willing to conceal the fact even from themselves if they can.

Here are some of the excuses given for smoking:

"I cannot think without my cigar." Many a business man holds his cigar in his mouth, unconscious as to whether it is lighted or not lighted. The stimulation of the fifth nerve, the nerve of sensation of the face, reflexly excites mental activity. When thinking hard, one man will bite his lip; another scowls; another scratches his head; another bites his finger nails; another chews gum; another presses the upper lip, or his cheek or his temple with the finger; another takes a pinch of snuff or lights a cigar, or simply places a cigar in his mouth. These are all different ways of stimulating the fifth nerve. If the use of tobacco were as harmless as biting the lip or scratching the head or even no worse than chewing gum, the chief objections to its use would disappear.

It is easy to see that whatever advantage is gained from tobacco as a means of stimulating the fifth nerve, may be as easily secured in some other harmless way, as by chewing a bit of licorice or gensing root or sweet flag.

"I am nervous when I do not smoke." Many men find in tobacco a solace which they are reluctant to relinquish. Without the accustomed cigar the smoker finds himself restless, nervous, dissatisfied, unhappy, nerves shaking, hands trembling, mind confused, inability to concentrate attention, indecision. A cigar or a cigarette temporarily dissipates these discomforts, but of course each time leaves the patient more nervous than before. Such a person is a neurasthenic. The smoking may be in whole or in part the cause of the neurasthenia; or, which is generally the case, the neurasthenia may be due to autointoxication, the result of chronic constipation or of colitis. These conditions must be remedied by proper treatment. In other words, the neurasthenia must be cured, and for this the disuse of tobacco is first of all essential. A real cure in such a case is practically impossible so long as the patient continues to smoke. Such a patient requires institutional care for a month or six weeks, which will afford an opportunity for a "change of the intestinal flora" and the formation of biologic habits, by the aid of which he may be able to live a comfortable, happy and efficient life without resorting to the "smoke screen" for consolation or steadiness.

"I smoke because I am lonesome. I miss my family, my wife and my little ones. A cigar comforts me."

Said a well-known clergyman to the writer: "My cigar is my refuge when I am overwhelmed with the worries and griefs which my parishioners confide in

me." A humiliating confession! Are there not adequate moral or spiritual and psychologic remedies for the mental and moral tempests from which one must sometimes feel compelled to take refuge? Certainly, the resort to a narcotic drug as a cure for psychic ills seems to be an admission of a complete breakdown of one's spiritual and mental resources.

And the refuge habit involves a danger of no inconsiderable proportions. Not a few of the worries, anxieties and troubles of life must be inevitably faced and mastered. To bury them in a fog of narcosis is only to follow the example of the foolish ostrich, which in the face of danger, hides its head in the sand. Will the smoker maintain that he employs his cigarette "solace" with discretion, denying himself the magic of this chemical comfort in every case in which fine discrimination, keen and well-balanced judgment and unclouded intelligence will best contribute to the removal of the cause or solution of the problems involved?

The complete answer to the plea that men need tobacco as a solace is to be found in the fact that few men are willing to share this pleasure of smoking with their wives, notwithstanding that the average wife has fully as large a burden of worries to carry as has the average man, and is less able to bear them, and certainly feels them no less keenly.

"I suffer from headache." The headache and depression from which the reforming smoker sometimes suffers usually departs with a warm bath and

a night's sleep. Rest in a horizontal position is most beneficial. Within a few days the depressed nerve tone will be restored, the circulatory balance will be recovered and the tobacco headache will disappear.

For these restorative changes to take place, it is necessary that the last trace of nicotine should be eliminated from the blood. The process of elimination may be greatly encouraged by eliminative treatment, such as hot baths, the electric light bath, the sweating pack, and especially by the copious drinking of water. One or two glasses should be taken every hour, totalling not less than three or four quarts daily.

"I smoke to aid digestion." Many smokers claim to find the after-dinner cigar a relief from certain symptoms of indigestion, particularly sour stomach or hyperacidity. It is known experimentally that tobacco lessens gastric activity and impairs digestion, and hence its influence on the stomach is not beneficial, but the opposite; nevertheless, being a narcotic, it is capable of producing temporary relief from discomfort. The same relief, however, may be obtained by much more efficient and satisfactory measures which are not merely palliative but actually curative. For example, acidity may be relieved by taking one or two teaspoonsful of olive oil, by the use of soft foods which require little mastication, avoidance of meats, tea, coffee and condiments, and by such other dietetic measures as are indicated for the relief of hyperacidity.

As a curative measure, tobacco proves to be a remedy which is "worse than the disease." It is a very common thing for smokers to offer as an apology for smoking the fact that a bowel movement usually follows the after-breakfast smoke, and is often missed when the cigar is omitted. Here, again, we have a case in which the remedy is, if not worse, at least as bad, as the disease. Constipation may be relieved by the use of bran, mineral oil and suitable attention to the diet. Certainly there is no occasion for smoking to induce bowel action when there are excellent remedies for this condition which are easily accessible and wholly harmless.

"I smoke because of nose trouble." Cigarette smokers sometimes insist that the cigarette is a necessity to them because of its efficiency in "clearing the head," and relieving the stuffed feeling in the nose, the result of the thickened condition of the mucous membrane. The cigarette affords temporary relief in chronic nasal disease only at the expense of making the trouble worse. The services of an intelligent nose specialist are required. In most cases, prompt relief will be given by the use of the Pocket Vaporizer. The relief afforded by the cigarette is temporary and delusive. The final result is always an aggravation of the difficulty.

"I am compelled to smoke to relieve asthma." Certain cases of asthma are relieved by the inhalation of the fumes of tobacco as well as the inhalation of cubebs and various other drugs. It is uni-

versally known that the relief thus obtained is merely temporary and that other measures must be relied upon to affect a cure. When other measures are applied, the necessity for temporizing measures disappears.

In most of these cases, the cause of the asthma is found in infection of the colon, or colitis, and auto-intoxication, and the asthma quickly disappears when the causes of the conditions are remedied.

Tobacco "Cures"

There are no drug substitutes or antidotes for tobacco. Any drug which will take its place will be found equally injurious if not more harmful. The various advertised "cures" are "fakes." They have been condemned after a thorough investigation by the *Journal of the American Medical Association*. The only "cure" is to be found in a resolute abandonment of the drug and of all drugs of similar nature, with the aid of such help as may be given by biologic living and the use of baths and other physiologic means.



